PLANMECA

PlanScan System
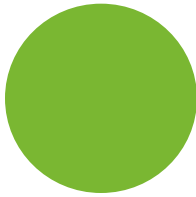## user manual

Table of Contents

1 Introduction

The Planmeca PlanScan Full System is a complete optical impression system for CAD/CAM of dental restorations intended for dental offices or laboratories. The system comprises a Planmeca PlanScan digital impression scanner, Planmeca Romexis CAD/CAM design software module, and Planmeca PlanMill 40 mill.

The Planmeca PlanScan scanner takes digital impressions which can be designed and customized on the Planmeca Romexis CAD/CAM design software. The impressions can be sent via Planmeca Romexis Cloud to Planmeca or a certified laboratory for design and milling or exported to a third party.

> **Note: Caution:** US Federal law restricts the Planmeca PlanScan to sale by or on the order of a dentist.

The Planmeca PlanScan Full System requires Planmeca Romexis software revision 3.4.0.R or later.

Associated Documentation

Planmeca Romexis User's Manual (publication number 10014593).

Exercise Workbook, Throughout the documentation, important notes and items of interest are formatted like this example.

Warning The orange Warning denotes something that can cause personal injury or physical damage to the equipment.

Some of the screenshots may have been taken in earlier software versions and may not exactly match your screen.

Indications for Use

Planmeca PlanScan Full System is an optical impression system for CAD/CAM of dental restorations. It is a device used for recording topographical characteristics of teeth, dental impressions, or stone models by digital methods for use in computer aided design and manufacturing of dental restorative prosthetic devices.

Contraindications

The Planmeca impression system is not indicated for orthopedics or any indication beyond dentistry.

Turn ON Laptop

Press the power button to start the laptop.

The Windows 8 Start screen appears. On your keyboard, press the [Windows] key to make the standard desktop appear if desired.

A warning may appear from Windows. Do you want to allow the following program to make changes to this computer?

Click **Yes.** This is a normal safety feature of Windows.

Logging In To Planmeca Romexis

1   Click this button on your desktop.

A login window opens.

> **Note:** The appearance of the Login window may differ from the view below depending on the settings configured by your administrator. See the Romexis User Manual for more information.

2   Type your user name and password and click **OK.**

The Planmeca Romexis application opens in Patient module.

The name of the current user is shown in the title bar.

Default Provider (sysadm) - Licensed to: Planmeca

To login as different user click this button.

To logout click this button. All currently opened files will be closed.

> **Note:** If you are trying to log in while another user is currently logged in, all patient records are closed but the current views will be stored and shown when the patient is next accessed by the user. This allows authorized personnel to view and modify patient status using their own credentials. If you logout no views will be stored and the patient data will be opened with default view when accessed next time.

Scanner

Removable Components

The PlanScan system has a set of removable components.

Connecting the Thunderbolt™ Adapter

Properly connecting and disconnecting the scanner prevents damage to your devices.

1   Insert the Thunderbolt adapter into the adapter slot on the side of the laptop. (The adapter should remain attached, even when not in use.)

2   After opening the PlanCAD software, connect the red FireWire connector of the scanner into the white Thunderbolt™ adapter.

The laptop gives an audible signal to confirm that the connection is fully seated.

To remove the scanner, hold the red end with one hand and with the other hand grasp the Thunderbolt adapter. Gently pull apart to disconnect. Leave the white Thunderbolt adapter attached to the computer.

Disconnecting the Thunderbolt™ Adapter

If you wish to remove the adapter from the laptop:

1 Disconnect the scanner and exit Romexis to the Windows desktop.

2 Navigate to the Eject Media icon in the lower left corner of the desktop.

3 Click the icon and choose **Eject IEEE 1394 Controller.**
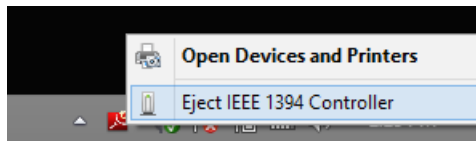
4 Remove the Thunderbolt adapter from the laptop.

> **Note:** Failure to follow this procedure may result in an inoperable scanner. For additional questions or concerns please contact Customer Support at 800.537.6700.

Scanner Indication Lights

There are colored LED lights in the button on the scanner.

• Green - Ready for Use. Scanner is connected, but not actively scanning.

• Blue - Laser ON. Scanner is actively scanning.

If scanner light is not illuminated, the scanner is not ready or it is not connected.

Cradle

The system comes with a standalone cradle for the scanner.

The cradle can be separated and inserted into a 5/8 inch (16 mm) holder in your operatory equipment (i.e. the slow speed suction holder).
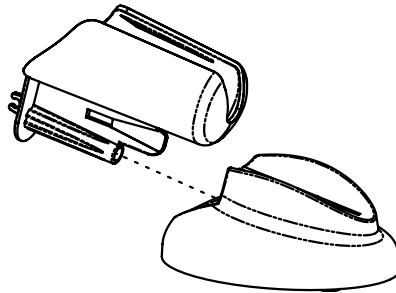
Moving/Viewing the 3D Model

Use the mouse to zoom in or out, move, and rotate the composite model.

Using the Mouse

> **Note:** The mouse cursor changes noted here do not appear on the Scan tab.

Rotating the Model

Rotate Model
press and hold the right button, then drag

1   Click and hold down the right mouse button.

The pointer changes to   .

2   Drag the mouse horizontally, vertically, or diagonally to rotate the image.

Drag in small increments for more control.

3   Release the mouse button to stop rotating. Repeat as needed.

Changing the Model Size

Zoom Model
rotate the wheel button to change the size of the model on the screen

Use the scroll wheel on the mouse to zoom in and out on the model.

1   Position the pointer on your model.

2   Rotate the mouse wheel downward, toward your wrist.

The pointer changes to   and the model becomes smaller.

3   Rotate the mouse wheel upward, away from your wrist.

The model becomes larger.

Moving the Model

The model can be moved without being rotated.

Move Model
up/down, left/right: press and hold the wheel button, then drag.

1   Position the pointer on the model.

2   Press and hold down the mouse wheel.

The pointer changes to .

3   Drag the model to the desired position and release the mouse wheel.

Using the Spaceball

Optional accessory.

The Spaceball is a 3D controller that enables you to zoom, move, and rotate the model in a more fluid way than the mouse. The use of this controller is optional. The mouse can be used alone if preferred.

Manipulating the Model

The Spaceball enables you to pan, zoom, and rotate separately or at the same time. The base of the Spaceball does not move, only the top half, called the cap, moves.

Place the Spaceball with the cord facing away from you. Place your fingers on the raised areas of the cap. This helps orient you to match the up/down/left/right of the cap to what's on the screen.

- **Pan -** Use side-to-side motions to move the model straight up and down or left and right.

- **Zoom -** Pull up or push down on the cap to zoom in and out.

- **Rotate -** Tilt the cap in the direction that you want to rotate the model.

Press the right button on the Spaceball to re-center the model on the screen. This also re-enables the mouse for moving the model. However, once the Spaceball is used, the mouse is deactivated.

By default, the center of the model is the central rotating point. If you want a different rotating point, move that area to the center of the screen and click on the left mouse button.

Models with multiple restorations will automatically rotate around the prep for each tab once the margins have been drawn.

System Options and Default Settings

Individual tabs are used to design the restoration: Setup, Scan, Margin, Design, and Mill. The tabs are dynamic. The choices you make on each tab affect the options available on that and related tabs. The typical restoration utilizes the tabs from left to right. Moving backwards in the process (e.g., modifying the settings in the Margin tab after completing the design in the Design tab) can cause settings and designs to be discarded. The system warns you when your actions will cause design data to be discarded.

Some system configurations will restrict the use and access of individual tabs.

Screenshots

You may wish to save an image of the screen for communicating with associates or Customer Support.

To take and save a screenshot:

On your keyboard, press the ⊞ key and **Prt Sc** keys.

The computer takes a screenshot and saves it in **Libraries - Pictures - Screenshots.**

The screenshots are automatically numbered. You can rename them if desired.

The Settings Screens

Access Settings by clicking the Settings button on the CAD/CAM screen or the Settings button on each tab. These screens contain preference settings that modify the default behavior of the software. The settings are based on each screen. Use the arrows to scroll right or left. Click a category to select it. Selected categories display in the bottom of the screen.

Click **Restore Factory Defaults** to revert to original settings, click **Save** to save changes, or click **Cancel** to exit without saving.

CAD/CAM Settings

Version

Displays the version of the software and imaging systems.

Reset Warnings

The warning and reminder screens have an option to **Do Not Show This Message Again.** If a new operator is using the system, you may want to reactivate these warnings.

Sprue Angle Method

(For mill systems)

The default setting is Tooth Specific. **Tooth Specific** places the sprue in the most commonly recommended position based on the type of restoration. **Optimized** selects the placement based on the fastest milling time. In all cases, the sprue can be manually moved on the Mill tab.

Margin Ramp

(For design systems)

Default: **0.25**

Default setting for the margin ramp incline. Use the slider or type a number in the box to change the setting.

Increasing the Margin Ramp decreases the space between the restoration and preparation at the shoulder. Decreasing the Margin Ramp increases this space.
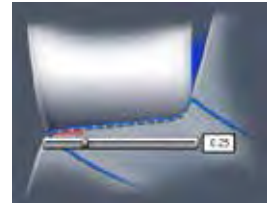
Spacer Thickness

(For design systems)

Default: **0.1** Top: **0.1** Sides

Default setting for the space between the preparation and the restoration.

Dropper Tool

(For design systems)

Default: **0.040** Thickness: **2.000** Width

Default setting for the dropper tool has an amount/thickness of material and how much surface area it covers.
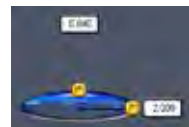
Spaceball Settings

(Optional accessory)

Select to activate the Spaceball option.

Network Settings

This screen should be used only under the supervision of a customer service representative. These settings are pre-configured and should not be changed.

Mill Notification Settings

(For Classic systems)

Milling Settings

(For mill systems)

Accessed from the Home screen or the Mill tab, Milling Settings determines whether to use **Standard** milling (overmill) or **Undermill.**

Milling Settings only affects proposals with a sharp interior, like an anterior incisal edge. If the interior of the proposal is smaller at the tip than the tools in the mill, the standard setting is for the mill to remove extra material at the tip. This may lead to a crown that is too thin at the top. The options are to round the preparation or to select Undermill. If Undermill is selected, the mill will not remove all of the interior. It will go as far as the tool's size will allow and the remainder must be removed manually.

1 Proposal

2 Standard

3 Preparation

4 Undermill
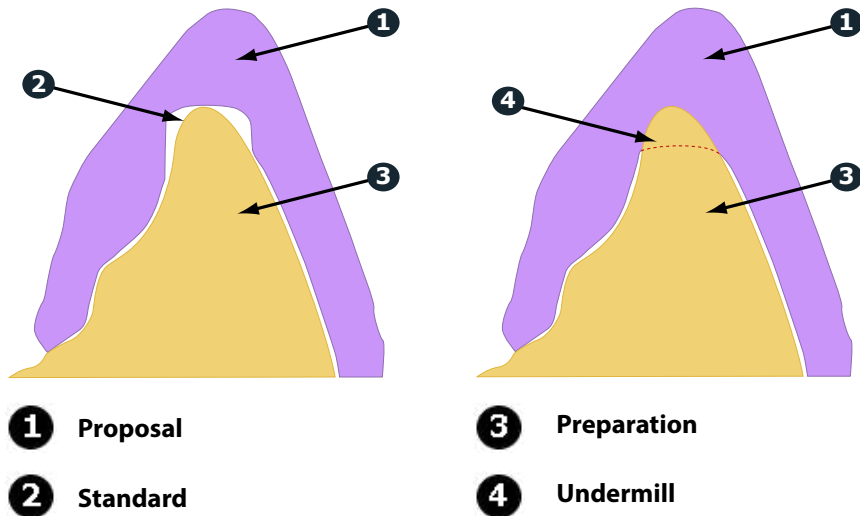
Auto or Occlusal POI

(For mill systems)

This should only be changed at the request of Customer Support. Auto POI (Orientation) finds the best possible milling path to avoid undercuts and this eliminates the need to go back (on veneer and multiple cases especially) and reset POI for the mill. Occlusal POI uses the Orientation to set the tool path.

For Your Information
See "PlanMill 40 Introduction" on page 163 for information on the Job Server and Mill.

2 *Administration*

This chapter describes the administrative functions associated with the Planmeca PlanScan Full System.

Relocating the Laptop and/or Scanner

The laptop can be unplugged and moved as needed. The software does not need to be shut down. The scanner can be disconnected at any time.

System Information and Upgrades

Software and Hardware

System software and hardware upgrades are initiated through Planmeca only. No software or hardware should be added or deleted to/from the Planmeca systems without prior approval of Planmeca. Doing so may result in damage to the system and will void the product warranty.

Cleaning the Scanner Tip

For intraoral scanning systems only.

The following instructions are for the removable tip of the scanner. It is not for the entire scanner. See instructions below for cleaning the base of the scanner.

Connecting the Scanning Tip

(After disinfection if scanning intraorally. See insert with scanning tips for further details.)

1   Grasp the body of the scanner with one hand.

2   Use the other hand to press the scanning tip onto the scanner as shown. A locking click is heard once the tip is fully seated.

Disconnecting the Scanning Tip

1   Grasp the body of the scanner with one hand.

2   With your other hand depress the green button on the underside of the scanner. Gently pull the tip from the scanner.

When the scanner is not in use, place the non-functional protective scanner tip on the scanner. *(Included with the scanner during shipping.)*

Note: Failure to follow this procedure may result in damage to the scanner and scanning tip.

High Level Disinfection:

DO NOT Autoclave. DO NOT place in Ultrasonic Cleaner.

1   Clean the tip for 2 minutes under running tap water at 22 - 25°C (4 liters/minute) to remove debris.

2   Test the potency of your activated MaxiCide Plus prior to disinfection. (Recommend MetriTest Strips by Metrex (HSD #602-3437)

3   Immerse the tip in activated MaxiCide Plus for 120 minutes (2 hours).

Note: Do not leave the tips soaking overnight.

4   Remove tip from the disinfectant.

5   Rinse disinfected part in three separate copious amounts of distilled water (1000 ml volume of water; minimum of 2" head height while part is immersed).

Agitate the tip in the water for 30 seconds and then let it stand in the water for another 30 seconds.

6   Repeat the agitation and soak in each of the other two containers with fresh distilled water.

Storage

1   Wipe water off mirror using non-woven optical wipes (recommend Kimwipes Lens Cleaning #101-7070).

2   Optional: Insert tip into a sterilization pouch. (recommend Self Seal Sterilization Pouch 5 ¼" x 10" [200/box] #112-4854)

3   Store for later use.

Note: Ensure the tip is dry before connecting it to the base.

Prior to scanning, visually confirm the scanning tip mirror is clean and dry.

•   To clean the mirror, use a Kimwipe, 2x2 gauze, or optical cloth with a little alcohol to gently clean the mirror.

•   Dry the mirror with a dry Kimwipe, 2x2 gauze, or dry optical cloth.

Cleaning the System

For intraoral scanning systems only.

Protect the keyboard with a disposable barrier.

Cleaning Cycle: Before and after each use, clean all areas of the Planmeca PlanScan Full System.

Warning: Before and after each use, follow these instructions to disinfect the Planmeca PlanScan Full System. Do not substitute any other cleaning solution or procedure. Under no circumstances should you use any paint thinner, solvents, or harsh chemicals. Use only a non-woven sponge or pre-moistened germicidal cloths when cleaning the Planmeca PlanScan Full System.

1   Using a clean, non-woven sponge that has been saturated with a hospital grade, TB-rated germicide or pre-moistened germicidal cloths, apply the germicide to the entire surface of the scanner base, scanner holder, mouse, mousepad, and any other surfaces that you touch that were not covered by a disposable barrier. Do not spray the germicide directly on the items and do not submerge the scanner or mouse in the germicide.

2   Follow the germicide manufacturer's instructions.

Additional Assistance

The following additional materials are provided to assist you in operating the Planmeca PlanScan Full System system:

- Quick Reference Cards

- Online Help

- Training Videos available at e4d.com/resources on the ECO Member's page.

If you have questions, please contact Customer Support at

Toll Free	800-537-6070
E-mail	customersupport@e4d.com
Fax	972-479-1106
Hours of Operation Monday - Thursday Friday	7 am – 7 pm CT 8 am – 5 pm CT
Web site	www.e4d.com
Mailing Address	D4D Technologies LLC dba E4D Technologies 650 International Pkwy Richardson, TX 75081

See "3M and E4D Support Guide" on page 219 for information on who to call if you are using a 3M True Definition™ scanner.

3 *Scanning Safety*

Warning: Failure to adhere to all safety warnings may result in personal injury, equipment damage, or data loss.

Do not use the Planmeca products for any purpose other than its intended and labeled use.

To prevent electrical shock, do not open any sealed or user restricted access panels or connectors.

In case of emergency unplug the computer power cord from the wall or from the computer.

Do not make any unauthorized repairs or modifications to the system software or hardware. This includes installing unauthorized software on the host computer system or altering or bypassing any safety switches or mechanisms. Changes or modifications not expressly approved by Planmeca could void the user's authority to operate the equipment and/or void the warranty.

Do not install or operate the Planmeca products in an environment where an explosion hazard exists, e.g., high oxygen area.

Comply with all applicable regulations when disposing of waste materials from the Planmeca products.

Do not attach any equipment or devices to the Planmeca products unless their use has been specifically authorized by Planmeca or E4D Technologies.

Medical electrical equipment requires special precautions regarding EMC (Electromagnetic Compatibility). The Planmeca products must be installed and placed into service according to the EMC information provided in the documentation that accompanies the Planmeca products.

Portable and mobile RF (Radio Frequency) communications equipment can affect medical electrical equipment.

The wireless components in the Planmeca products may be interfered with by other equipment, even if the other equipment is fully compliant with CISPR (International Special Committee on Radio Interference) emission requirements.

When possible, electrical equipment should not be used when adjacent to other electrical equipment. If adjacent use is necessary, the equipment should be observed to verify normal operation in the configuration in which it will be used.

When connecting the Planmeca components, use only the cables supplied with the products. Failure to do so may result in increased electromagnetic emissions or reduced immunity to external electromagnetic emissions.

If you suspect equipment malfunction or failure, discontinue using the Planmeca products and contact Technical Support immediately. Do not attempt to make any repairs on the Planmeca products.

Read and comply with all safety, warning, and instructional labels on the Planmeca products.

4 *Setting Up a Restoration*

Managing Patients in Planmeca Romexis

Creating new patients
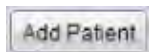
1 In the **File** menu click the **Add Patient** button.

The Files module opens

2 Enter the necessary information and add a face photo if desired.

> **Note:** The obligatory fields are in bold text. In the example below, they are Person ID, First name, and Last name. See "Patient File Changes" on page 229 for more information.

3 To save the patient into the database click the **Save Patient** button.

> **Note:** The changes are not saved unless Save Patient button is used.

> **Note:** To view the newly created patient on the list, perform new patient search.

Searching Patients

Patients can be searched by ID or by name.

Search patients by ID

> **Note:** You cannot use the ID search if you have activated the Autonumber option in Romexis Configuration. See "Patient File Changes" on page 229 for more information.

1 Select the option **Find by Person ID** from the drop-down menu.

2 Enter the patient ID in the text field and click the **Find** button.

Search patients by name

1 Select Find by name from the drop-down (see image above).

2 Enter the patient's name in **Last name, First name** format into the search field and touch the **Enter** key or click **Find** to make matching patients appear in the patient list.

To view all patients saved in the database use the * sign as the search term.

If a partial name is entered all patients whose last name begins with that partial string will be shown. To search patients by their first name replace the last name with the wild card *.

Examples:

- **Doe, John:** all patients whose last name is Doe and first name John

- **S:** all patients whose last name starts with the letter S

- **Smi :** all patients whose last name starts with 'Smi', e.g. Smith and Smiley

- **Van Gogh:** all patients with the last name Van Gogh

- ***, Paul:** all patients whose first name is Paul

Searching assigned patients

To retrieve all patients assigned to the current user click the **Find assigned.**

Sorting patients

Patients in the patient list can be sorted by ID, last name, first name, birth date, age, gender, phone number, the number of assigned providers and type (for virtual and template patients) as well as by assignments.

To sort patients click the respective column title.

Person ID	Last Name	First Name	Date Of Birth	Age	Gender	Phone Number	Provider	Type	Assignments

Selecting and opening patients

1   Click the patient name in the patient list.

2   Click the **Select** button (or double-click the patient name).
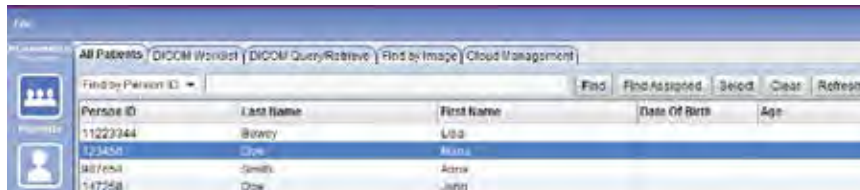
3 In the opening dialogue select the reason for opening the patient record and click **OK.**
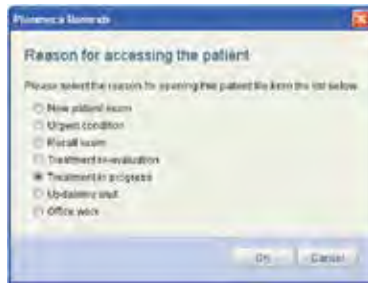
> **Note:** This request can be set as optional in the Planmeca Romexis Configuration application. See the Romexis manual for more details.
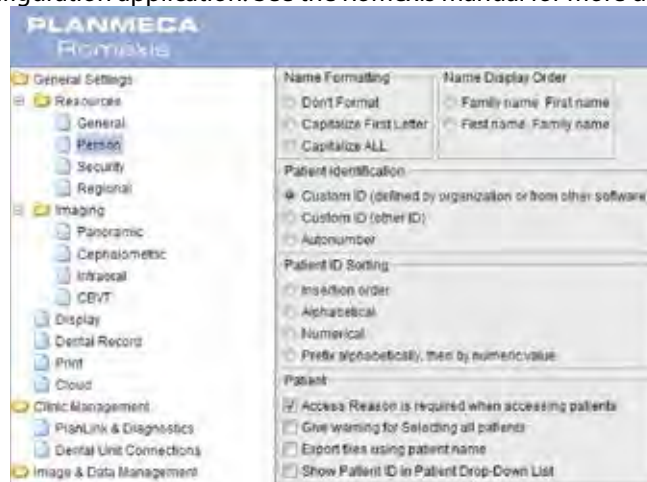
Planmeca Romexis automatically opens the Files module.

The reason for opening a patient record is saved and displayed in the dental record under the patient case history.

The name of the active patient is always visible in the upper right corner of the screen. Several patient records can be open at a time but only one of the open records is active at a time.

To close the active patient click the **Close Patient** button.

To view all open patients click the arrow of the drop-down menu.

To select and modify another open patient select the name from the drop-down menu.
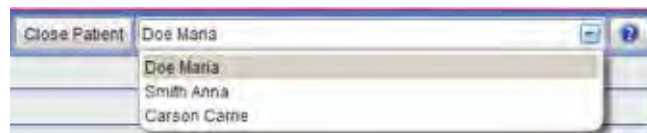
Managing Cases

1   Connect the Planmeca PlanScan scanner to your computer by connecting the scanner's connector to the computer's FireWire port.

The Planmeca Romexis software automatically recognizes the scanner.

2   Click the **CAD/CAM** module button.

The following window opens.
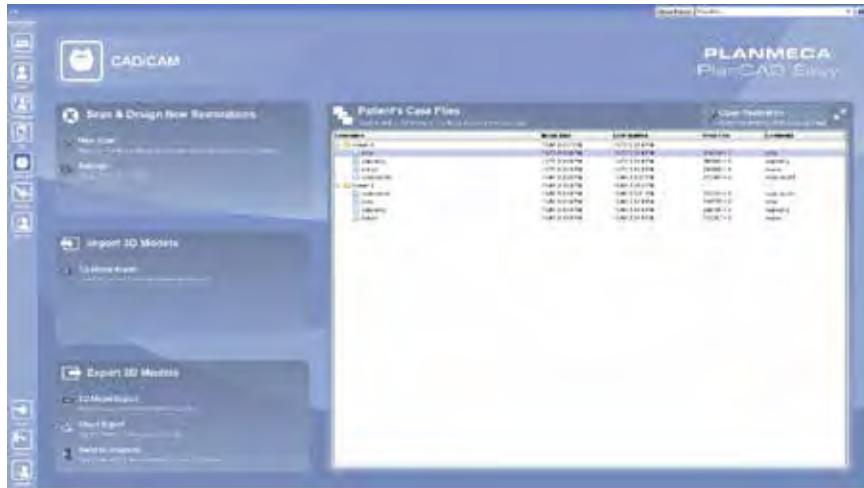
Select what you want to do:

- Start a new restoration - See below for more information

- Open an existing restoration - See below for more information

- Import 3D models - See Planmeca Romexis User's manual for more information

- Export 3D models - See Planmeca Romexis User's manual for more information

Deleting Files

To delete an image (stl file) from the patient's case files right-click on the file and select **Inactivate STL.**
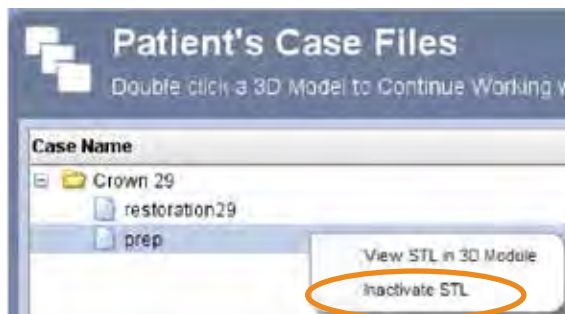
To delete a case from the patient's case files right-click on the case and select **Inactivate restoration.**

To reactivate or permanently delete a case from the database see the Romexis User Manual.

Starting a New Restoration

1   To start a new scan click **New Scan and Design**.

> **Note:** Click **New Scan Only** if you do not have a design license.

2   To open an existing scan or restoration (crown, inlay, onlay etc.) double-click on a case on the list or click the **Open Restoration** button.

> **Note:** Click **Open for Design Only** if you do not have a scanning license.

The case opens in the Planmeca PlanScan Full System Setup tab.

Setup tab

Use the Setup screen to set the restoration type, occlusal data type, material, and tooth library. If you open an existing restoration, many of these settings may already be selected.

> **Note:** For Scan Only cases, click the Scan tab at the top to skip the Setup tab. This tab must be filled out for Margin, Design, and Milling.

The Setup screen requires that the settings be made in a particular order because certain parameters depend upon previous selections. Always define a restoration in the following order:

1   Select a restoration site by clicking on the anatomical model. If no teeth have been selected, the anatomical model is closed until the mouse cursor is moved near it.

The currently selected tooth is orange. If any other teeth are part of this restoration file, they are green.

For bridges, select the abutments and the pontic(s). See "Designating a Bridge" for more information.

> **Note:** You can do up to 16 restorations on the same arch at one time. Repeat these steps for each tooth individually.

> **Note:** To change the tooth numbers, "Changing Tooth Numbers and/or Country" on page 229.

2   Choose the restoration type.

3   Select the opposing scan type.

> **Note:** The majority of exported case recipients will require Buccal/Opposing cases. Bite registration cases can only be sent to someone else using a PlanCAD system.

4   Specify a tooth library. See *"Smile Design" on page 38* for more information on the tooth libraries.

5   Specify a material. See *"Block Selection" on page 40* for more information on material selection.

6   Specify a shade. The shade is shown on the Mill instructions along with the material and block size.

> **Note:** You can change the tooth library on the Design tab. The system offers block size options on the Mill tab. The material can be changed on the Mill tab Settings

7   Click the **Scan** tab or click **Next.**

Changing the Tooth Selection

1   If the wrong tooth was highlighted for the restoration, right-click the tooth and click **Deselect.**
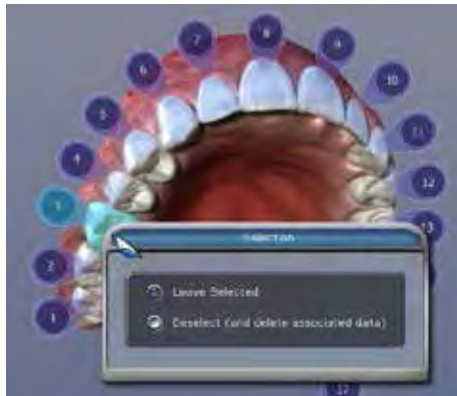
2   Click on the correct restoration site.

Smile Design

The facial pictures below show the anterior library options grouped together by type.

Round-Round
Teeth 7 through 10 are **Anterior A1.** Teeth 6 and 11 are **Library A.**

Square-Round
Teeth 7 through 10 are **Anterior A2.** Teeth 6 and 11 are **Library A.**

Square-Round
All teeth are **Library C.**

Square-Square
Teeth 7 through 10 are **Anterior A2.** Teeth 6 and 11 are **Library A.**

Cutback A4

The lingual pictures below show the anterior library options grouped together by type.

Round-Round
Teeth 7 through 10 are **Anterior A1.** Teeth 6 and 11 are **Library A.**

Square-Round
Teeth 7 through 10 are **Anterior A2.** Teeth 6 and 11 are **Library A.**

Square-Round
All teeth are **Library C.**

Square-Square
Teeth 7 through 10 are **Anterior A2.** Teeth 6 and 11 are **Library A.**

Cutback A4

Block Selection

With over 200 combinations of block sizes, materials, and shades available, the selection of the correct block can be a daunting task. Here are some guidelines (for more specific directions, contact your local Ivoclar Vivadent or 3M ESPE representative):

- 3M ESPE supplies E4D's composite block - **Paradigm° MZ100.** Because of the custom mill paths within the mill, this block will typically mill much quicker and have less associated bur (tool) wear. These blocks are cylindrical. Insurance coverage may vary compared to ceramic blocks.

- **Lava Ultimate** is a nano resin ceramic ideal for all indications including implant superstructures. Fast milling, no firing for great results.

- Ivoclar Vivadent categorizes their **IPS Empress°** block selection by amount of translucency; **LT** blocks have lower translucency and therefore are more opaque, allowing some visual blocking of the underlying tooth structure (ideal for full coverage). **HT** blocks are higher translucency blocks; they are great for inlays and onlays where surrounding tooth structure can positively affect the esthetic outcome.

- **Multiblocks** are blended in color and translucency from cervical to incisal and allow for complete esthetic control.

- **IPS e.max** is a lithium disilicate glass-ceramic material that comes in a pre-crystallized state which changes color and strength when fired. In its final tooth colored state, IPS e.max CAD offers 360 MPa of flexural strength which is nearly three times the strength of many millable ceramics available chairside. Adjustments should be made to the e.max restorations while in the blue stage.

- **IPS e.max Impulse** are supplied in three Values (Value 1, 2, 3) and two Opal shades (Opal 1, 2). They are mainly used for veneers. The Value blocks feature different brightness values: 1 is the lowest and 3 the highest. The Opal blocks exhibit a decreasing opalescence and increasing brightness value from 1 to 2.

- **Telio CAD** blocks are intended for long-term provisional restorations (maximum wear of 12 months).

- **Zirlux FC2** is full contour zirconia that can be milled with the PlanMill 40. Zirlux FC2 requires a sintering oven.

- **Burn Out Blocks (BOB)** are used to manufacture an acrylic pattern for further fabrication methods utilizing the burnout technique, including casting and pressing for inlays, onlays, crowns, as well as other dental applications.

The block selection chart provides general direction on what block or category of block is recommended for different types of restorations. Please understand that the clinical situations and parameters (preparation, occlusion, patient compliance) are all factors in the success of the final restoration regardless of the material.

Restoration Type

CAD/CAM Materials	Anterior Full Crown	Anterior Veneer	Posterior Full Crown	Inlay/Onlay	Implant	Bridge
Paradigm MZ100	⚠	⚠	✓	✓	Provisional Only	
Lava Ultimate	✓	✓	✓	✓	✓	
IPS Empress CAD HT	✓	✓	✓	✓	⚠	
IPS Empress CAD LT	✓	✓	✓	✓	⚠	
IPS Empress Multi	✓	✓	✓	✓	⚠	
IPS e.max CAD HT	✓	✓	✓	✓	✓	Anterior Only
IPS e.max CAD LT	✓	✓	✓	✓	✓	
IPS e.max CAD Impulse	✓	✓	✓	✓	⚠	
Telio CAD	⚠	⚠	⚠	⚠	⚠	Provisional Only
Zirlux FC2	⚠	⚠	✓	⚠	⚠	✓
Burn Out Block (BOB)	FOR CAST OR PRESSED INDICATIONS ONLY					

✓ Primary Indication
✓ Secondary Indication
⚠ With manufacturer caution

5 Scanning

This chapter does not apply to cases that are imported from another scanning system.

Warning The scanner is a high precision Class 2 laser scanning instrument. Always store the scanner in its cradle when not in use. To prevent damage or misalignment, do not drop or strike the scanner. Follow all stated precautions when using the scanner.

The scanner captures the restoration site with a laser system and delivers live images to the monitor. As you take multiple snapshots, the system creates a composite image of the restoration site, revealing any areas that need further scanning.

Scan Tab Layout

1 Scan Type
2 Model Editing Tools
3 Evaluation Tools
4 Alignment Tools

Positioning the Scanner for the First Scan

Position the scanner along the mesial-distal axis with the tip of the scanner pointing towards the distal. The axis follows the curve of the arch. The pictures below show good and bad positions along the arch.
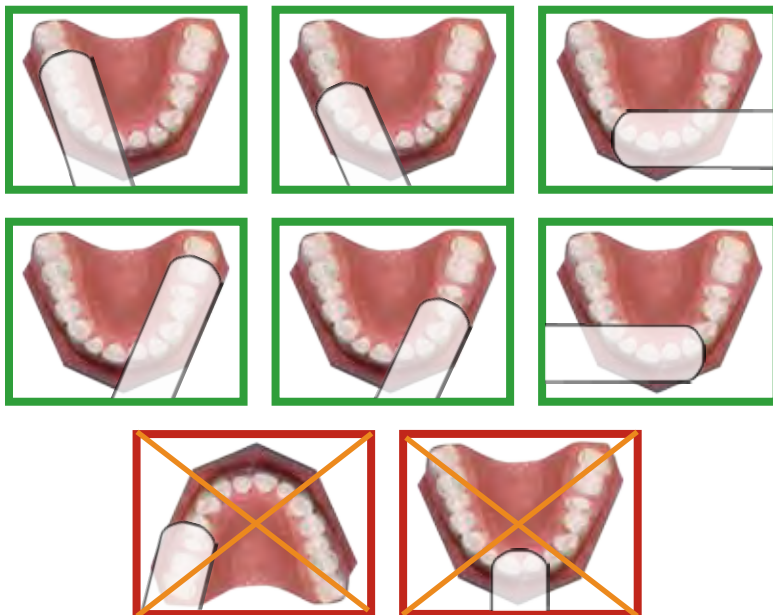
Rest the tip of the scanner gently on the teeth during scanning. This will give you the correct focal depth for the scans.
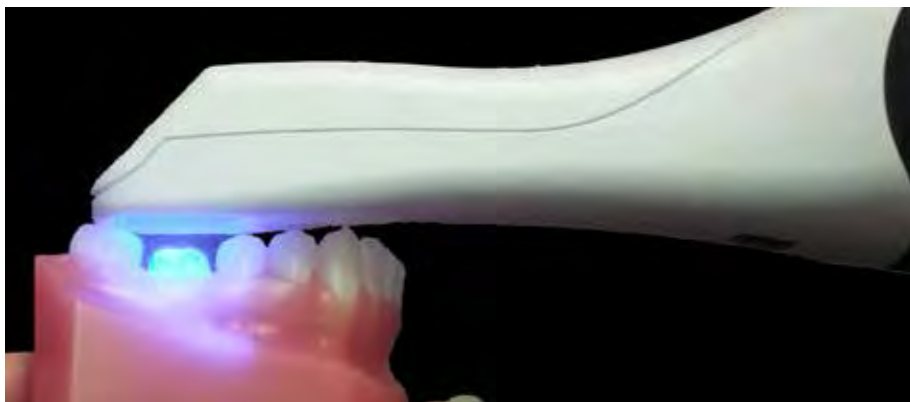
Scanning Overview

Scan the restoration site using the E4D scanner to capture the image of the tooth (pre-operative or wax-up), preparation, opposing teeth, buccal bite, and/or bite registration. Scanning the restoration site requires proper site preparation, correct placement and movement of the scanner, and a sufficient number of scans to ensure adequate digitalization of the restoration site. The basic steps are:

1   Click the **Scan** tab.

2   Click the desired scanning mode: **Pre-op, Prep, Bite Registration, Opposing,** or **Buccal Bite.**

- **Pre-op -** Used to utilize the patient's existing dentition or a wax-up as the pre-op model for creating the restoration.

- **Prep -** Used to scan the prepared site of the restoration. All free flowing blood, saliva, and residue should be removed from the preparation site before scanning.

- **Opposing -** Used to scan the teeth on the opposite arch of the preposition. Scan the same number of teeth as the preparation model to ensure good alignment.

- **Buccal -** Scan the buccal view of the preparation, adjacent teeth, and opposing teeth.

- **Bite -** Used if you have produced a bite registration for use in defining the occlusal anatomy. This button is active when Bite Registration is selected on the Setup tab.

3   Shield the site from strong extraneous light sources (dental lights, sunlight, etc.).

4   Click the button on the scanner to activate the laser.

5   The Live View displays the scanning view with live feedback. Place the scanner so that the camera is centered over the occlusal of the restoration site.

> **Note:** The system assumes that the first scan is taken from the occlusal. Ensure the first scan is taken at a 90 degree angle to the occlusal surface. If the first scan is not optimal, delete it and retake it.

6   Follow the Scanning Goals below.

7   Continue taking scans until the composite model is fully formed.

8   Click the button on the scanner to deactivate the laser.

9   Click **Generate Model** or press **M** on the keyboard to finish building the model.

10 Evaluate the model.

11 Make adjustments as needed.

12 Select the next scan type.

13 Repeat the steps above.

14 Click the **Margin** tab or click the **Next** button when finished with scanning.

Scanning a Basic Posterior Preparation;

Goals

100% of the prep and interprox. contact areas

90% of the adjacent teeth

Good axial data (buccal and lingual) for design

2-3 mm gingival tissue on buccal and lingual

Begin with the occlusal. Top down scans to lay down the foundation. The first scan is the most important scan because it determines the default orientation. The angle of the first scan should be an occlusal scan.

The first scans are of the occlusal surface. **Starting over the preparation,** take scans of the occlusal surfaces moving in half tooth increments.
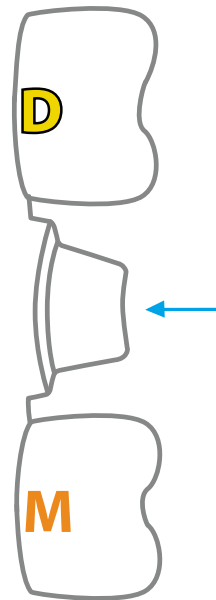
D **Distal**   M **Mesial**

Step-By-Step

Occlusal scans

1   The first scan is of the preparation.

2   Keep the scanner parallel to the occlusal table. Take overlapping scans and move in half-tooth (or less) increments.

3   The last occlusal scan is the center of the mesial neighbor.

Rotate Clockwise

The right side of the scanner is stronger because of how the laser is reflected. That is why you always want to rotate to the right before going to the left.

1   Use small rotations over the mesial neighbor to create overlapping scans as you transition from occlusal scans to a clockwise rotation.

2   Scan along the right side of the teeth. Rotate the scanner to almost 90° from the occlusal table.

3   Watch as your model builds to see any areas that might require a different rotation or angle.
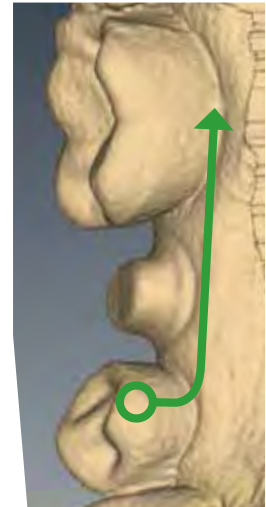
Distal Adjacent Tooth

Rotate in small increments across the distal adjacent tooth until you reach the left-hand side. This enables you to capture the occlusal data as you shift from one rotation to the other.

Rotate Counter-Clockwise

Scan from the distal to the mesial along the left-hand side of the teeth.

The last scan is of the mesial neighbor.
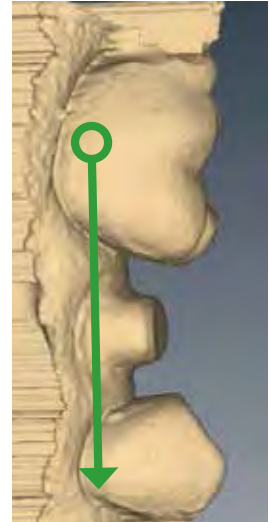
The system displays a model based upon the scan data. The Live View appears on the right and the model builds on the left. Watch the model building on the left to see what information has been captured and where you need to move the scanner.
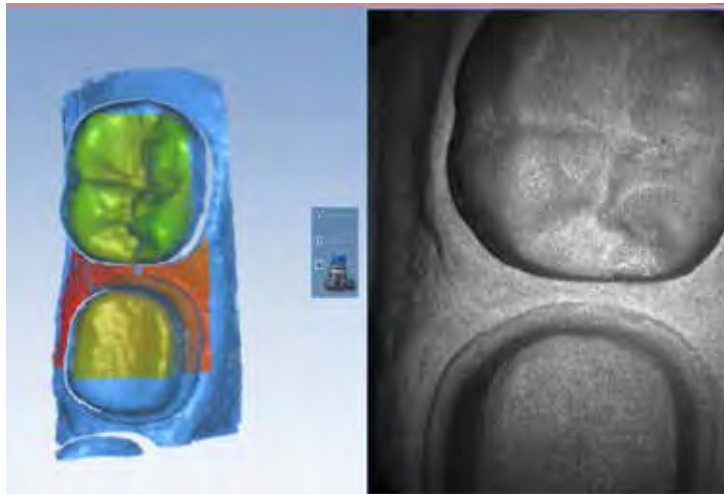
The system changes the Live View to orange if you have moved too far and the system needs data overlap.

The most recent scan added to the model displays with a color coding to indicate the focal distance of the data added.

- Green - close to the tip

- Yellow/Orange - middle of the range

- Red - end of the range (far away from tip)

> **Note:** Any color shown means the scanner IS capturing data. The colors only correspond to the focal distance.

The building model rotates to match the Live View.

Click the button on the scanner to stop scanning.

A raw data model is displayed.

Click **Generate Model** or press **M** on the keyboard to create the 3D model. If you exit without generating the model, the scans will be lost.

Click **Data Density View** to evaluate the model for low data. See "Checking Your Model For Missing Data" on page 51 for more information.

For design purposes, you may want to acquire more details of the adjacent teeth. If extra scans are desired, deactivate Data Density View to speed up the process. Reactivate when finished scanning.

> **Note:** If the mesial adjacent tooth is missing, take scans of two teeth on the distal side and vice versa.

Scanning Options

Adjust Live View Window Size

While the Live View is active, The window size can be adjusted. By default, the Live View is large enough to fill the height of the scanning window. To make it smaller, place the mouse cursor on the left edge of the Live View. Right-click and drag the window to the desired size.

The Live View will return to the default size next time it is activated.

Adjust the Scanning Field of View

The scanning area can be reduced if tongue, cheek, instruments, etc. are interfering with your scans. Most clinical operators do not change the Field of View.

Click and drag the Field of View indictor to the desired setting.
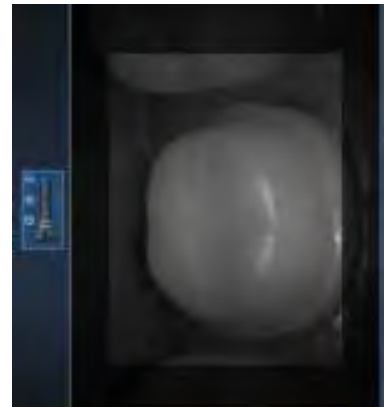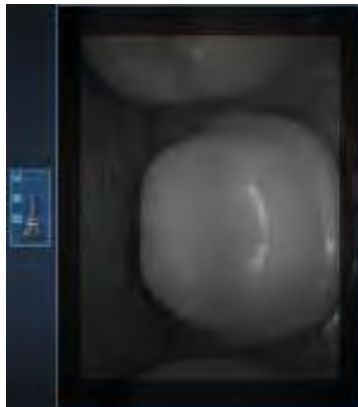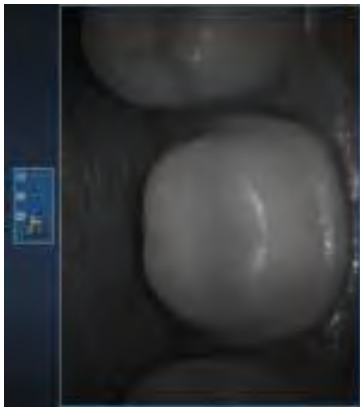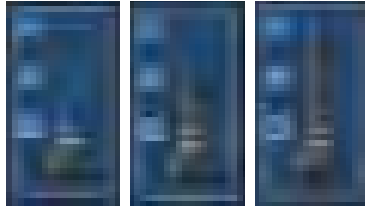
Evaluating Your Model

Checking Your Model For Missing Data

Click **Data Density View** to evaluate the model for low data. If multiple scans are needed, deactivate this button to speed up the process.

Your model should resemble the example below. The adjacent teeth are important in designing the restoration. Ensure you have enough detail, approximately 90%, to align the restoration with its neighbors.

1 Click **Data Density View** if it is not already activated. The model refreshes with the dark blue and purple areas indicating the least data. Rotate the model to analyze it.

2 Dark areas on your restoration site and interproximal contact areas should be rescanned.

In the example below, the standard scan pattern was not taken and key areas are missing data. Look for colored areas on the prepared tooth, especially on the margin. The adjacent teeth should have good data on the interproximal contact area, occlusal surfaces, and of the lingual and buccal contours. Data below the height of contour is not as crucial on the adjacent teeth .
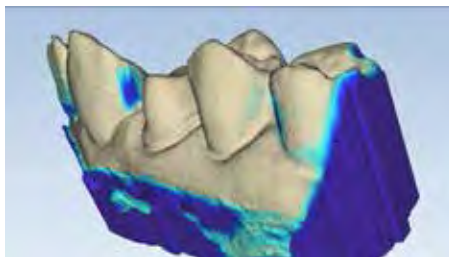
3 If areas lack detail, take additional scans.

With a couple of additional scans, the example is greatly improved.
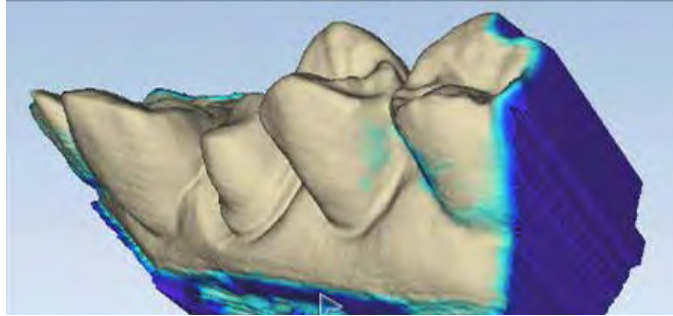
4   Click **Data Density View** again to return to the normal view.

5   Click the **Margin** tab or click the **Next** button when finished with scanning.

Eraser Tool

Use the **Eraser Tool** to remove parts of the scanned model. This can be used to remove unnecessary data like extra teeth, tongue, cheek, etc. With this tool, you can also erase an area that needs to be rescanned. If you spot a problem (i.e. the margin is partially hidden by cord or tissue), you can erase that area, correct the problem on your model or intraorally, then rescan just that area! You do not have to start over. Be sure to erase and rescan ALL areas that were changed.

The Eraser is also used in the Pre-op and Bite Registration Time Saver tools (see following sections).

Click the Eraser tool to deactivate it and regenerate the model.
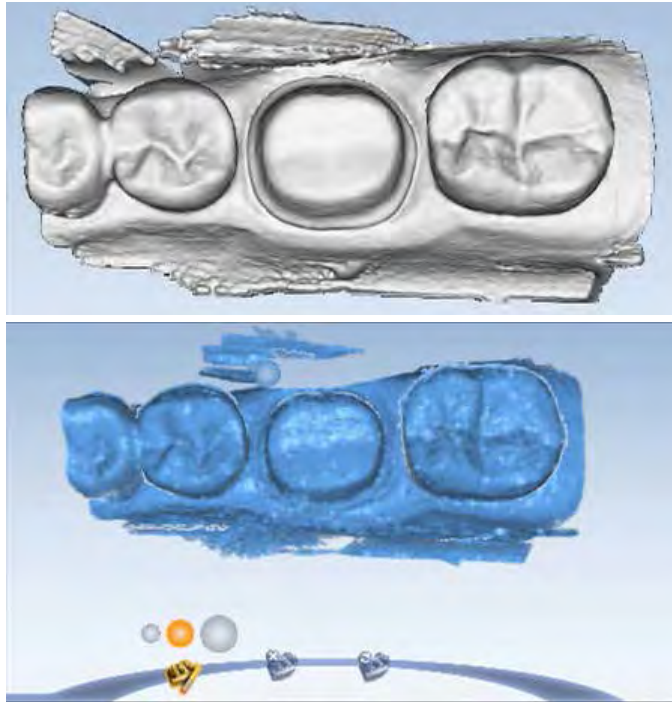
Note: Keep some of the buccal or lingual data when erasing. If you disconnect the two halves of the model, half of the model will disappear. It is also recommended that you not delete multiple teeth in a row. Large gaps in the model is not recommended.

Reset Model

Click the **Undo Erase** Erase button to reset the model if a mistake was made when erasing.

Delete Model

Click the **Delete Data** button to remove the model and start over.

Scanning Occlusion Data

The proposal's occlusion can be evaluated and designed using:

- Bite registration

- Buccal bite and opposing dentition

- Pre-op (a waxup or existing anatomy before preparation)

> **Note:** Cases being sent via Planmeca Romexis Cloud usually need to be Buccal/Opposing cases.

On the Setup tab, select Bite Registration or Buccal/Opposing. If you are scanning a pre-op, leave the default to Buccal/Opposing.

The system will allow you to use a Time Saver method of copying the model. In certain scenarios, this enables you to duplicate a model under another heading. You can then erase the data that needs to be replaced and take fewer scans than if you are doing a completely new scan.

- Pre-op model can be copied into Prep model

- Prep model can be copied into Bite Registration

The instructions below assume that you will use the Time Saver method. You always have the option of simply doing a full scan for each model type.

Scanning a Bite Registration

A bite registration can be used to optimize occlusion for proper alignment with the opposing tooth. Scan the preparation, ensuring there is enough detail of the adjacent dentition and/or gingival tissue in your preparation scans to align the bite registration scans.

After scanning the preparation, prepare the bite registration.

Bite registration preparation

Keep the following recommendations in mind as you prepare bite registrations:

1. Place the bite registration material so that it completely covers the preparation surface.

   - The bite registration material should not cover the adjacent teeth. If it does, trim to the interproximal after the material sets.

   - There must be sufficient data of the adjacent teeth in the scans of the preparation and the bite registration in order for the two models to align.

   - Ensure there are no gaps between the bite registration material and the adjacent teeth.

2. Have the patient bite down firmly or press the articulated model down firmly for the impression.

3. If trimming of the bite is needed to expose more of the adjacent teeth, trim the bite in the mouth. If you remove and replace it, the bite registration material may not seat properly.

Bite registration scanning

Goals

100% occlusal data

1 On the Setup tab, select **Bite Registration**.

2 On the Scan tab, click **Scan Prep** and scan the preparation model first.

3 Click **Scan Bite**.

A Time Saver message appears. This message only appears when the preparation is scanned first. The Time Saver option allows you to duplicate the preparation model and use the same data for the bite registration model.

> **Note:** Time Saver cannot be used in conjunction with Impression Mode.

4 Click **OK** to use the Time Saver. If you do not wish to use the Time Saver option, the bite registration and adjacent teeth can be scanned on their own. The following instructions assume the use of the Time Saver option.

A copy of the preparation model is created in the bite registration model color.
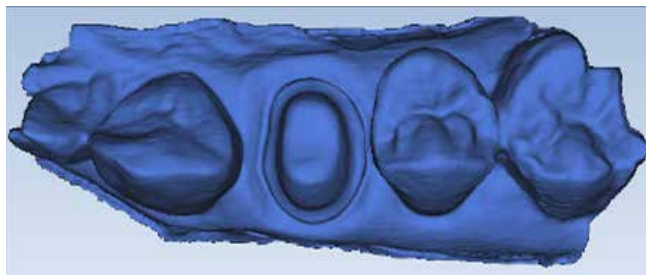
5 Click the **Eraser Tool.**

6 Erase the preparation and the marginal ridges of the adjacent teeth.
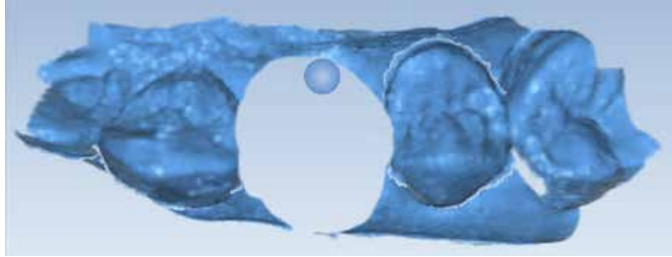
7 Click the **Eraser Tool** to deactivate it. The model is smooth where the data has been erased.
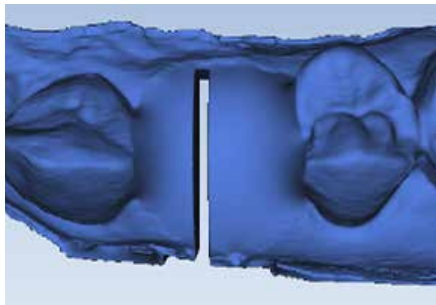
8 Activate the scanner and scan begin the scans with the occlusal of one of the adjacent teeth. Once you have established where you are, you can begin scanning the bite registration data.

9 Scan the occlusal of the bite registration material and any of the adjacent tooth data that was removed and is not covered by the bite registration.

Selecting the Bite Registration

Highlight the opposing dentition to designate which areas of this model should be used for occlusion.

1 Click **Bite Selection** at the bottom of the screen. This icon only appears on the Scan Bite screen.

2 Click and drag to highlight the areas of the opposing dentition that would come into contact with the restoration.
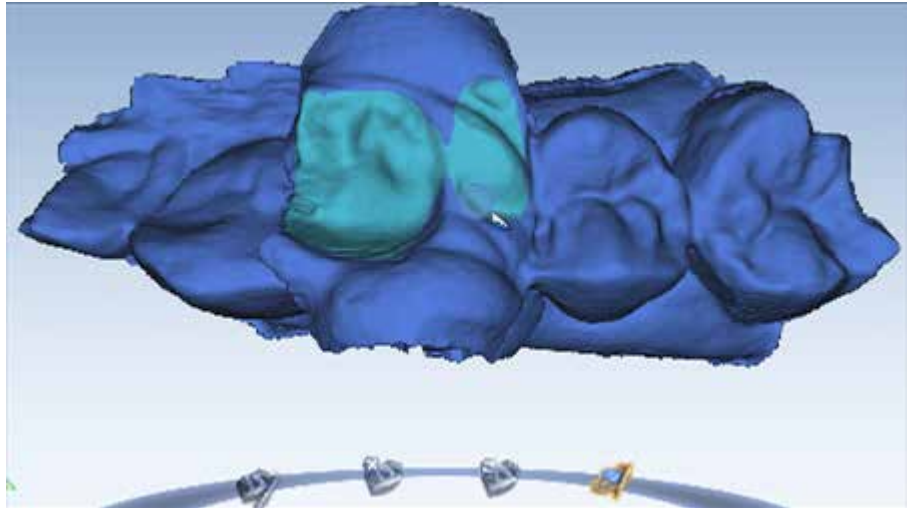
3 Click **Bite Selection** again to deactivate it.

> **Note:** Click Reset if you made a mistake and need to start over.

Scanning Buccal/Opposing

The opposing teeth are scanned to acquire bite information for the proposal. The buccal bite is scanned to align the preparation model with the opposing model.

Scan Opposing

1   On the Setup tab, select **Buccal/Opposing.**

2   On the Scan tab, select **Scan Opposing.**

3   Starting with an occlusal view, scan the occlusal surfaces of the opposing dentition. Include the same number of teeth as the preparation model. Ensure there is good cusp tip data on both the lingual and buccal sides.

4   Roll to the buccal and scan the buccal side of the opposing dentition. Include gingival data, do not stop halfway down the tooth.

Your model should resemble the following:

- Good occlusal data
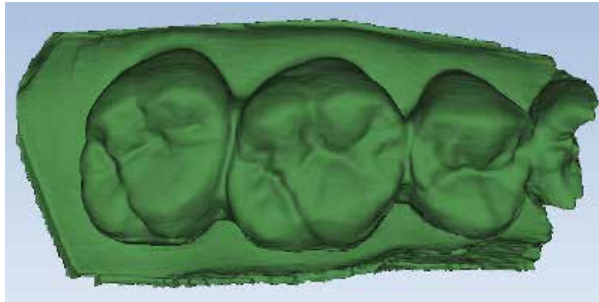
- Good buccal data
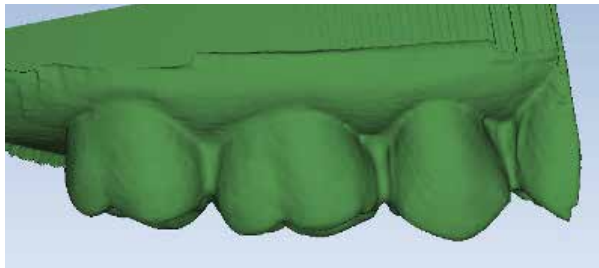
- Good lingual cusps. Lingual axial data is not needed.
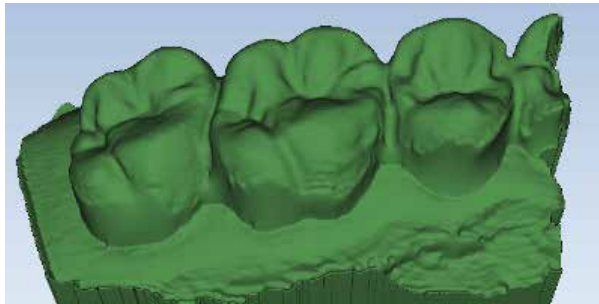
5 Erase extra data from the opposing model.

Scan Buccal Bite

1 Click **Scan Buccal Bite.**

2 Press the articulated model down firmly or have the patient bite down firmly and tell them not to move while you are scanning. If they shift during the scanning, the alignment may be incorrect.

> **Note:** Position the scanner tip against the inside of the cheek while the patient is open. When the scanner is in place, ask the patient to close and bite down firmly. Tell them not to move during scanning. Keeping the scanner tip against the cheek and not rubbing against the gingiva during scanning is typically more comfortable for the patient.

3 Scan at a 90° angle to the teeth. Scan the sides of the teeth that were captured in the preparation and opposing models. Ensure some gingival data is captured.

4 Click **Generate Model** or press **M** on the keyboard. The system generates the model and attempts to align to the other scanned models. The software should automatically align the models. If the Align Buccal is red, see below for instructions on manually aligning the data.

Your model should resemble the following. Ensure there is good data on the buccal sides of the teeth. Intraoral scans will most likely have the tongue in the background. Model scans will have space filler in the gaps.
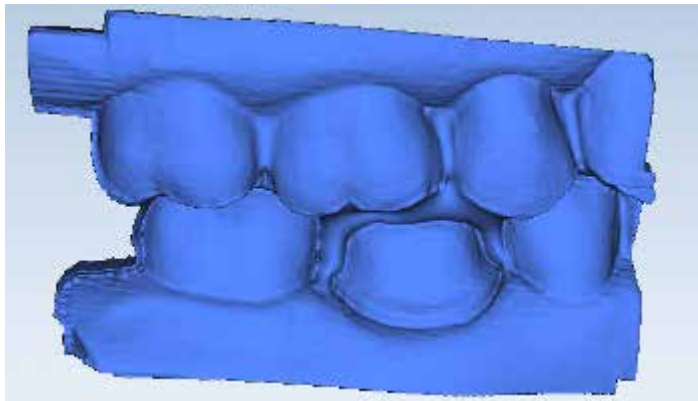
5 Erase any excess data from the model.

Model Alignment

There are no tools to rotate the models. It is important to start your scanning in the same orientation for each scan. Rescan the model if you scanned something in backwards.

The alignment icons are on the right side of the screen. There is a different icon for each alignment type: Buccal Bite, Pre-op, and Bite Registration. The system attempts to automatically align the models as they are generated. A green dot means the scans are aligned. A red dot means they are not aligned.

Click the icon to view the alignment. All of the alignment icons have a Refresh button. Click Refresh to reset the alignment and manually align the models. Automatic alignment should be used in most cases.

If there is extra data that might be interfering with the scans (tongue, cheek, etc.), try trimming the extra data before manually aligning.

The buccal bite model is translucent on the Alignment screen to aid in evaluation. The buccal bite has an extra Show/Hide Buccal option. This enables you to hide the buccal bite model and evaluate the opposing and prep models.

To align models, drag and drop the buccal bite, pre-op, or bite registration over the prep model.
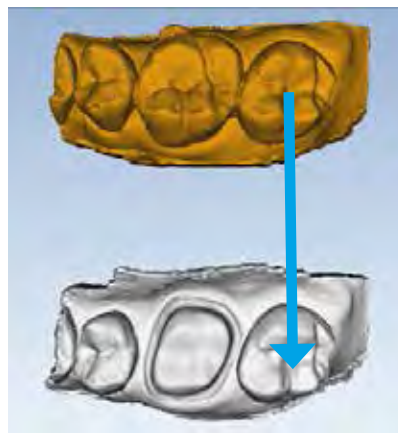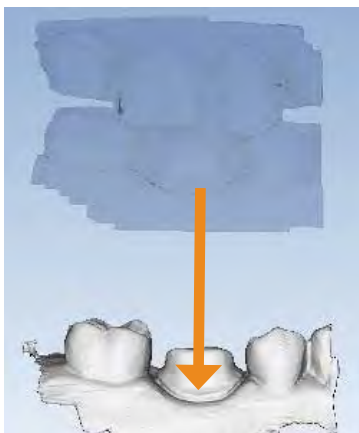
The models will snap into place or will return to their original positions.
In Buccal/Opposing cases, the opposing model appears after the prep and buccal bite are aligned. Click and drag the opposing model to match the buccal bite model.
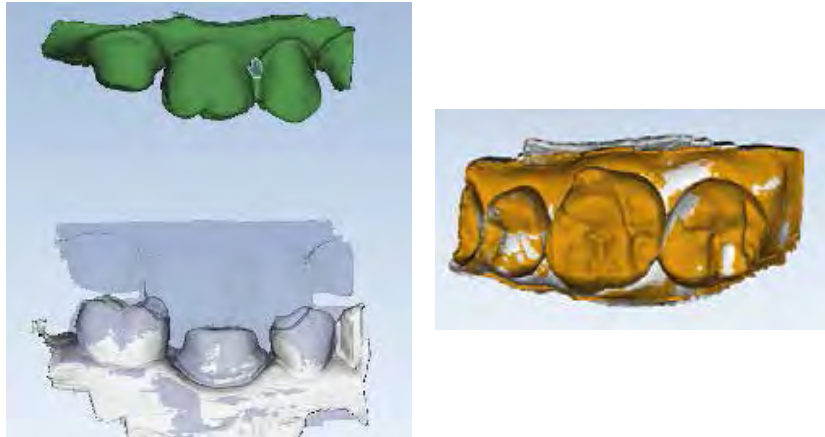
To access the menu options at the top or to return to scanning, deactivate the selected Alignment icon. You cannot proceed if the Alignment icon is active (orange).

Scanning a Pre-op

Use Scan Pre-op when you want to scan a pre-operative tooth or a wax-up. Pre-op scans can be used in combination with the Library tooth or can be used as a template, like a bite registration.

1   On the Scan tab, click **Scan Pre-Op.**

Scan the pre-operative tooth or wax-up with the same scanning techniques used for the prepared anterior or posterior tooth.
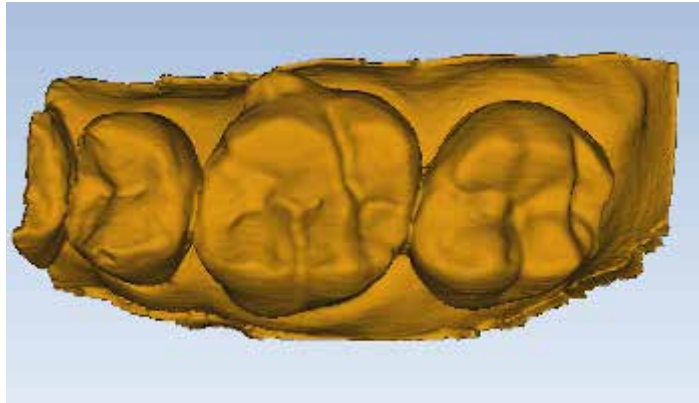
2   Prepare the tooth.

3   On the Scan tab, click **Scan Prep.**

A Time Saver message appears. This message only appears when the pre-op is scanned first. The Time Saver option allows you to duplicate the pre-op model and use the same data for the preparation model.

> **Note:** Time Saver cannot be used in conjunction with Impression Mode.

4   Click **OK** to use the Time Saver. If you do not wish to use the Time Saver option, the preparation and adjacent teeth can be scanned on their own. The following instructions assume the use of the Time Saver option.

A copy of the pre-op model is created in the preparation model color.

5   Click the **Eraser Tool.**

6 Erase the tooth that has been prepared and the marginal ridges of the adjacent teeth.
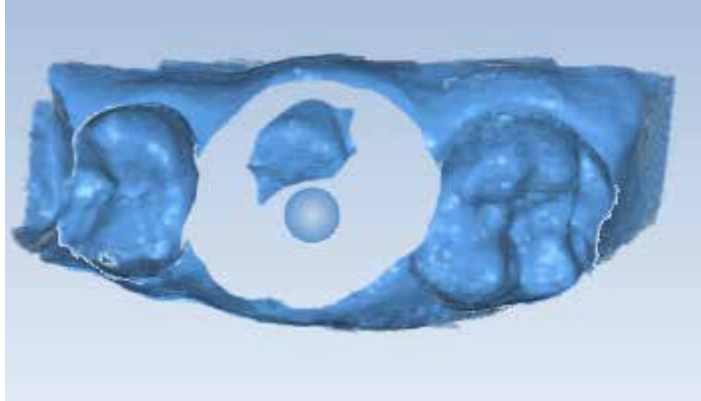
7 Click the **Eraser Tool** to deactivate it. The model is smooth where the data has been erased.
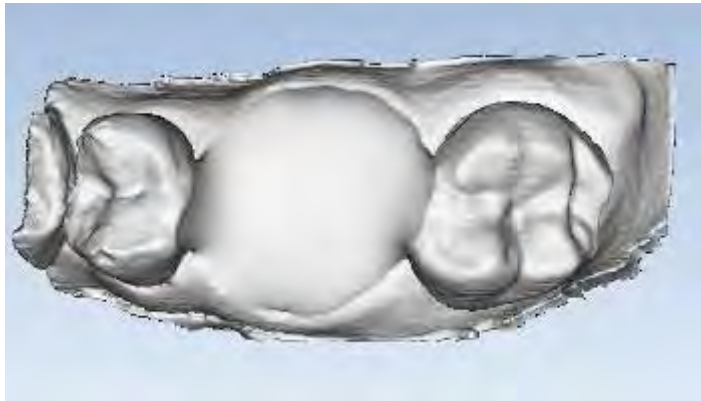
8 Activate the scanner and begin the scans with the occlusal of one of the adjacent teeth. Once you have established where you are, you can begin scanning the preparation.

9 Scan the entire preparation and any of the adjacent tooth data that was removed.

10 Click **Generate Model** or press **M** on the keyboard.
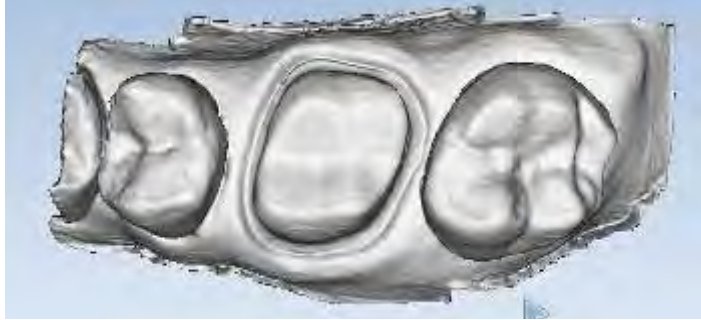
Scanning Multiple Restorations

In scanning multiple restorations, the basic scanning technique is expanded to encompass the extra preparation(s).

1 On the Setup panel, select the tooth number for the first preparation and then select a **preparation type, library, material,** and **shade.**

2 Repeat for each prepared tooth.

3 Click the **Scan** tab.

4 Start on the most distal preparation. Two examples of multiple restoration models shown below.
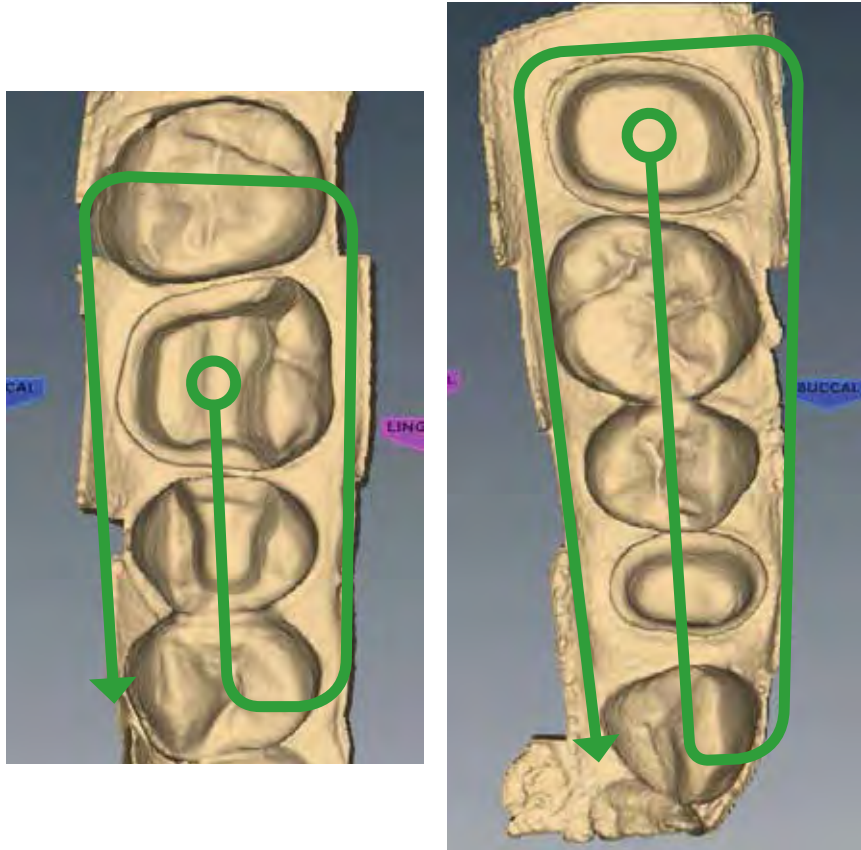
The basic scanning pattern is expanded to encompass the extra preparations and any teeth in between.

Scanning an Anterior

The scanning pattern for anteriors is similar to the posteriors. Since there is more varying data on the lingual side, it is recommended that the lingual scans be taken after the occlusal scans.

1   Start on the prep and scan the occlusal of the prep and the mesial neighbor.

2   Rotate to the lingual and scan the prep and adjacent teeth.

3   Rotate across the distal neighbor to reach the facial side.

4   Scan the facial side.
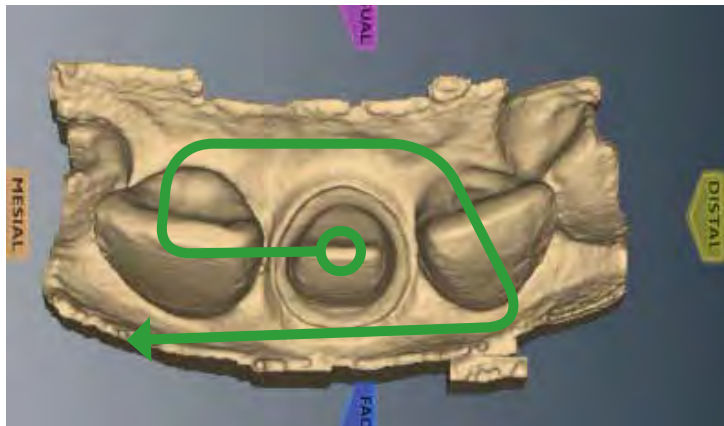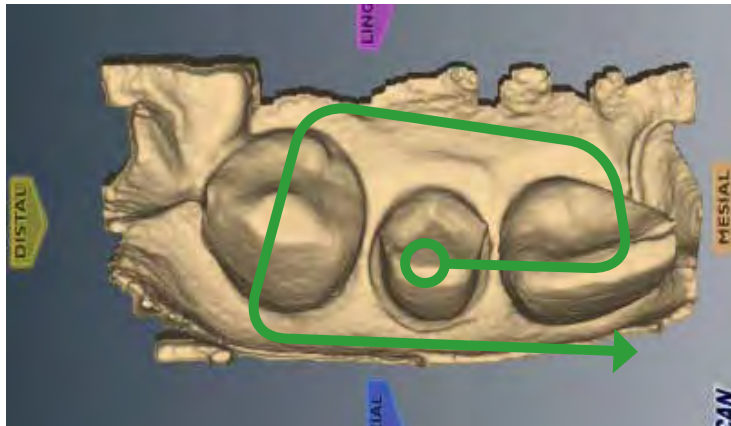
Watch the model as it processes to ensure the scans are applied to the correct area. Anterior teeth are often very similar to each other. Following the suggested scanning steps lowers the chances of misalignment. The scanning method is the same for all anteriors.

When scanning intraorally, it is sometimes more comfortable to have the scanner tip pointing towards the mesial instead of the distal. In this case, the surface indicators on the model will be incorrect until the Orientation is changed.

For Your Information

Optional Additional Scans

Evaluate your model. When you have long and straight anterior teeth, additional facial scans are sometimes needed to capture all of the data. With the adjacent tooth or preparation in the center, gradually rotate down the facial side of the tooth.

For optimal design, more scans of the adjacent teeth may be desired.
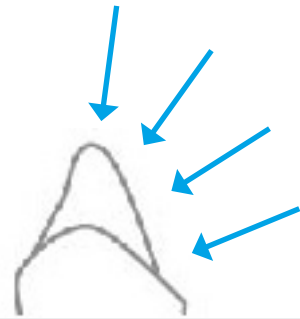
5   Click **Data Density View** to verify the integrity of your model. Rescan any dark areas on the preparation or adjacent teeth.

6   Click the **Margin** tab or click the **Next** button when finished with scanning.

Alternate Scanning Pattern

Some operators use a "saddle" pattern to roll back and forth over the straight and long anterior teeth. This pattern can help avoid misalignments when dealing with such similar teeth.

Scanning Multiple Anteriors

When scanning multiple anteriors and crossing the midline, start the scanning with the highest tooth number (Universal) or higher quadrant (ISO) to get the correct orientation.

| For Your Information |
|---|
| When scanning intraorally, it is sometimes more comfortable to scan with the scanner tip pointing towards the mesial instead of the distal. There are a couple of options for dealing with this situation.
 • Take the first scan with the scanner pointing the correct way. Turn the scanner around to a more comfortable position and retake the first scan. Watch the model as it applies the second scan and ensure the scan is placed correctly. This will not work if there is insufficient data for the system to recognize the two scans as the same position. If the second scan aligns correctly, continue scanning in the normal pattern.

 When crossing the midline, lingual scans are recommended for more data and fewer flat surfaces. After you turn the scanner around, pay careful attention to where the system places the next scan. Repeating a previous scan can help the system recognize that the scanner has been turned around. If the scan is placed in the wrong area, there may not be enough data on your model to turn the scanner around and more scans will be required.

 • Alternatively, take the first scan of the higher tooth number with the scanner pointing towards the mesial or start with a lower tooth number. In this case, the surface indicators will be incorrect until you reach the Margin tab. On the margin tab, turn the model around when setting the Orientation. |

Scanning Impressions

Remove the excess impression material so that the scanner can get closer for scanning.
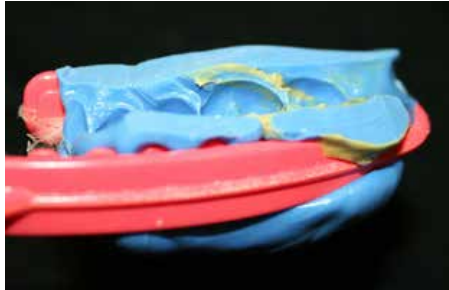
Note: Any impression material can be used. The system does not require a particular color or type of material.

Positioning the Scanner

When scanning the impression, ensure the tip of the scanner is pointing towards the distal for the initial scans so that the orientation of the model will be correct.
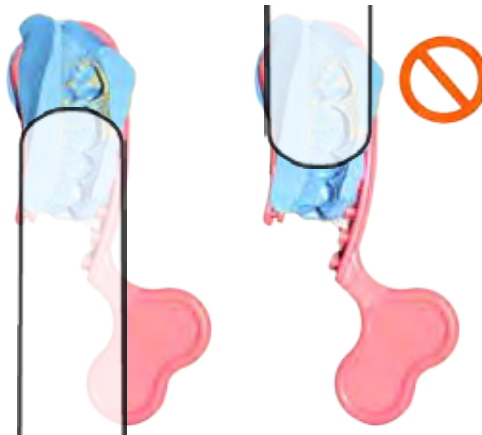
Due to the nature of impressions, the normal positioning of the scanner may not be able to capture all of the walls of the impression. You can also tilt the scanner up or down or turn the scanner perpendicular to the impression to achieve the necessary point of view.
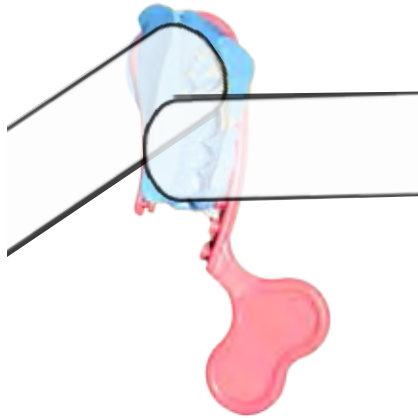
Scanning the impression

Ensure the scanner is positioned correctly. See above for positioning. Be careful not to squeeze or otherwise distort the impression while scanning.

1 On the Scan tab, select **Scan Prep** if it is not already selected. Do NOT select Scan Bite Registration, which resembles an impression.

2 Use the same scan pattern as for an intraoral or a model scan.

3 Click **Data Density View** to evaluate the model for low data.

Note that from the occlusal view, the impression can give the optical illusion of looking like a regular model.
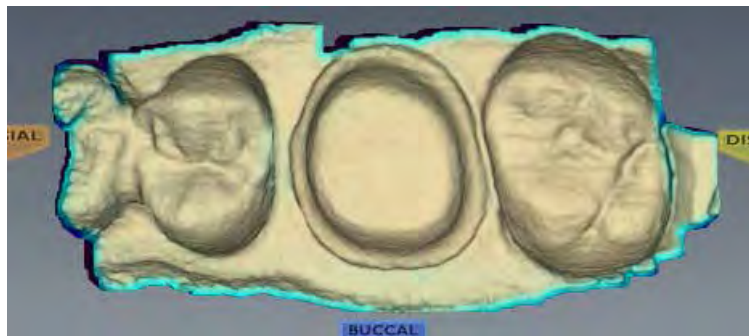
4   Rotate the model to see all of the impression. Be sure to check the contact areas on the adjacent teeth.
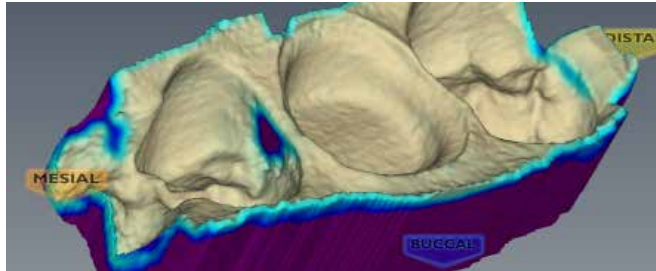
5   If there are areas that need additional scans, such as the mesial interproximal area shown above, take extra scans.

6   Click **Data Density View** to deactivate it.

7   Click **Impression Mode** to invert the model into the normal view. All other tabs will use the inverted model of the impression for creating the proposal.

8   Click the **Margin** tab and continue with the normal procedure for drawing the margin and designing the proposal.

6 *Orientation*

This chapter does not apply to Scan Only systems. Scan Only operators will click Orientation to deactivate it and proceed to mark the margin (page 92) and align the buccal scans (page 103).

Orientation - The selected model position for Autogenesis to propose the new restoration. Autogenesis in turn uses this set position as a starting point for cusp height and marginal ridges based on the adjacent teeth.

The first scan determines the initial positioning of the model.

Orientation affects two major aspects in the design software.

- Design - Orientation plays a large part in Autogenesis and determining that the anatomy aligns with the adjacent teeth.

- Milling - The path of insertion determines the Orientation needed for milling. In order for a restoration to mill out properly, the margin and axial walls must be visible from the occlusal view.

In most cases, these two factors can be accomplished with one Orientation and will only need minor adjustment. There are situations when greater adjustments to Orientation are required.

Intraoral scanning examples:

- Tooth position and size of the patient's mouth can sometimes make it difficult to get a perfectly positioned first scan.

- Depending on an anterior tooth's placement and whether you are right or left handed, it may be necessary to point the wand in the wrong direction. If the tip of the wand is pointing towards the mesial instead of the distal, then the surface indicators on the model will be incorrect until the Orientation is changed. see "Rotating the model" on page 84 for more information.

Model or impression scanning:

If you accidentally scan a model or impression backwards (with the wand pointing towards the mesial), see "Rotating the model" on page 84. Only the preparation model can be turned around. If you scanned a pre-op, buccal bite, bite registration, or opposing model backwards, then they must be rescanned.

When the Margin tab is selected, **Orientation** is automatically activated. The model displays with the Orientation Circle.

When Orientation is active, the model is rotated using the left mouse button.
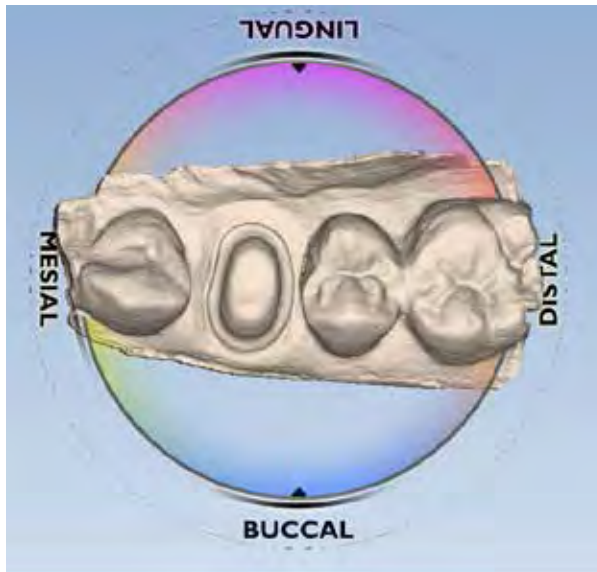
Viewing the model

In Orientation, the model displays with a circular graphic labeling the mesial, distal, buccal, and lingual surfaces. Zoom out to see the buccal and lingual labels, if desired.

Note: The Skyball is deactivated for Orientation.

The model should also be evaluated from the sides. Click the arrows in View Controls to view the desired surface.
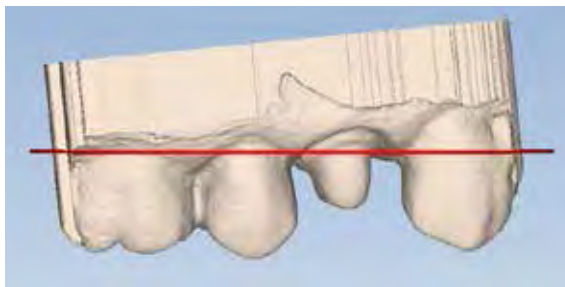
Moving the central point

The central point of the orientation circle is the middle of the screen, which may or may not be the location of your prep. If the central point is not on your preparation, it can be a little confusing when rotating the model.

It is not necessary to center the model on the preparation, but it can be helpful if you are new to rotating a 3D model or if you have multiple preparations. The example below shows a model with extra teeth scanned in, so the preparation is not in the middle of the screen.
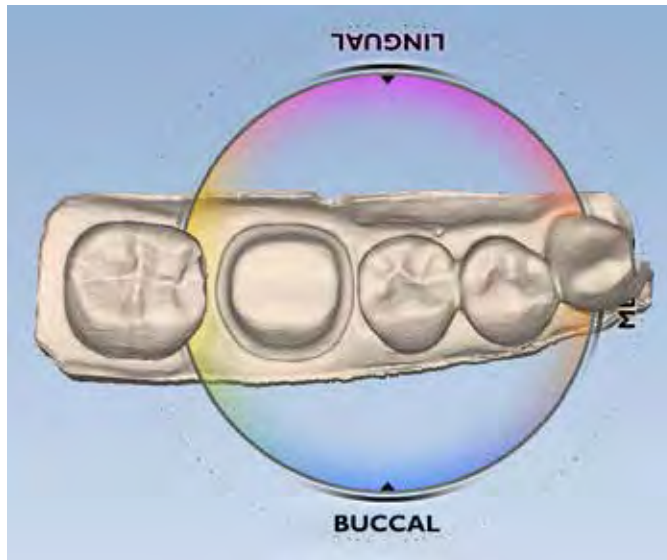
To move the model so that your preparation is centered, hold down the mouse scroll wheel and move the model. The circle graphic moves with the model, but you can see the model moving in relation to the tabs at the top of the screen. When the scroll wheel is released, the circle graphic refreshes and moves to the center. Repeat as necessary.
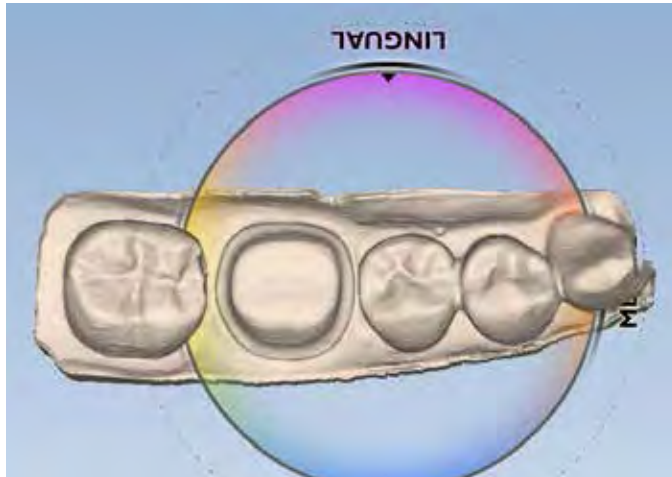
Moving with scroll wheel held down
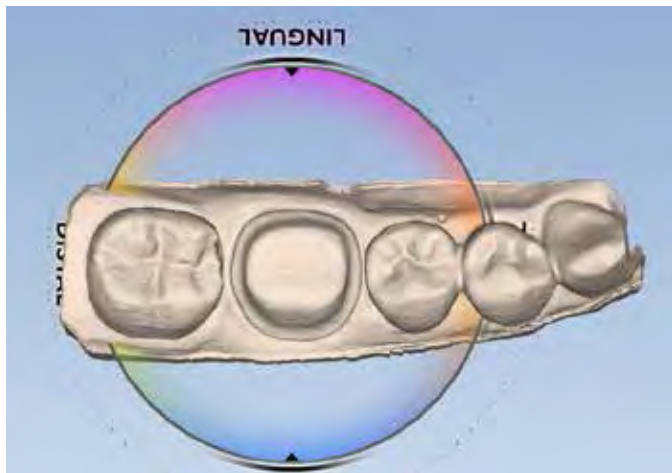
After scroll wheel is released

Single Restorations

Occlusal View

If the wand was not parallel to the preparation on the first scan, the model will be tilted. In this example, the model is tilted to both the buccal and mesial sides.

The occlusal view is good for buccal/lingual adjustments.

1   Position your mouse near the Buccal label on the circle graphic.

2   Hold down the left mouse button and move the mouse straight up as indicated by the arrow in the graphic below. Rotate the model until it has a good buccal/lingual alignment. You should be able to see the occlusal tables clearly and you can see the same amount of data on the buccal and lingual sides of the adjacent teeth. Do not worry about aligning the central grooves.
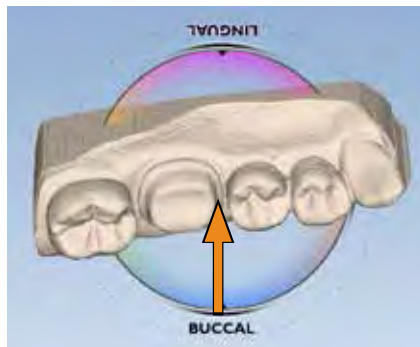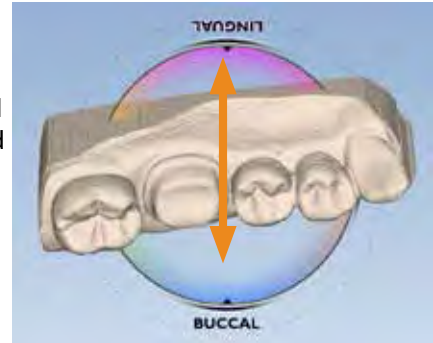
Before
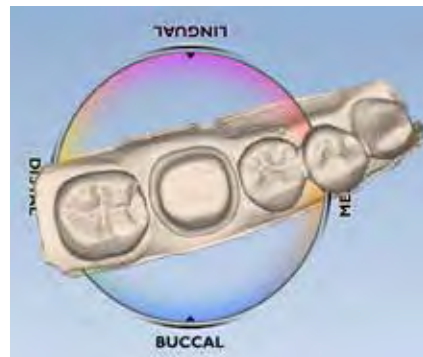
After - model has rotated towards the lingual. Buccal/lingual data is visually even.

Distal View

The distal or mesial view is good for mesial/distal and occlusal/gingival adjustments.

1   Click the **Distal** arrow in View Controls.

The distal view is sometimes obscured by high distal data. Tilt the model up or down to see the cusps of the adjacent teeth.

2   Evaluate the cusp heights of the adjacent teeth. Align your cusps and axial walls according to the Curve of Spee.
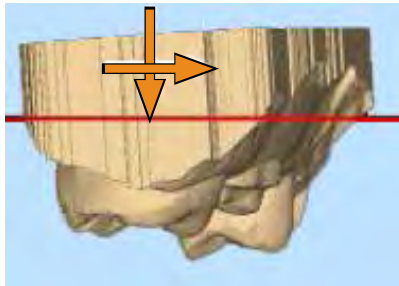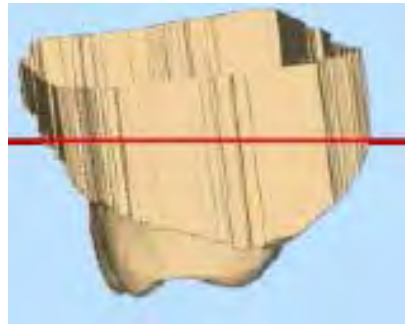
Before   *After - proximal cusp tips and axial walls are aligned*

3   Click **Buccal** or **Lingual** to view from the side.
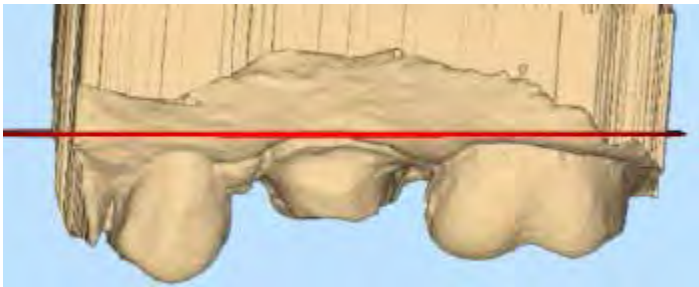
Use the red line as a guide to evaluate the marginal ridge alignment of the adjacent teeth. In this example, the alignment is good.

Return to the Occlusal or Distal view to make adjustments if necessary. You do not want to adjust the orientation from the buccal or lingual point of view because it is easy to accidentally change the mesial/distal alignment at the same time.

4   Click **Occlusal.**

5   From the occlusal, ensure the model is straight across from mesial to distal. Imagine a straight line going from the mesial to the distal (shown in orange below).
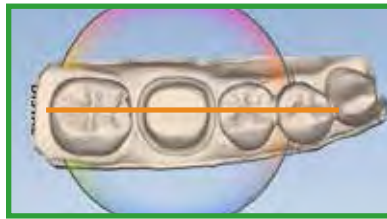
	Correct	Incorrect

Correct   *Incorrect*

6   When satisfied, click **Orientation** to accept changes.

Orientation can be reactivated and altered at any time. If Autogenesis has already been applied, be sure to go to the Tooth Libraries screen and reapply the library tooth for the new orientation. See "Apply the changes" on page 106 for instructions.

Verifying Orientation

After the Margin is drawn and edited, the Preview Library icon appears. See "Creating the Margin" on page 92 for more information. This is an optional step that displays an example proposal that has not been aligned with the adjacent teeth. The position of the preview tooth is based on the Orientation. It can be used to evaluate and adjust the Orientation.

1   Click **Preview Library.**

A green tooth appears above the margin. If this is a partial restoration, the preview tooth may be significantly smaller.

2   With Preview Library activated, you can activate Orientation and evaluate the overall alignment of the model.

3 From the occlusal, is the central groove in alignment?

4 From the buccal, are the marginal ridges parallel to the marginal ridges of the adjacent dentition? Note that the preview tooth is usually higher than the adjacent teeth. The proposal will drop down to align with the adjacent teeth during Autogenesis.
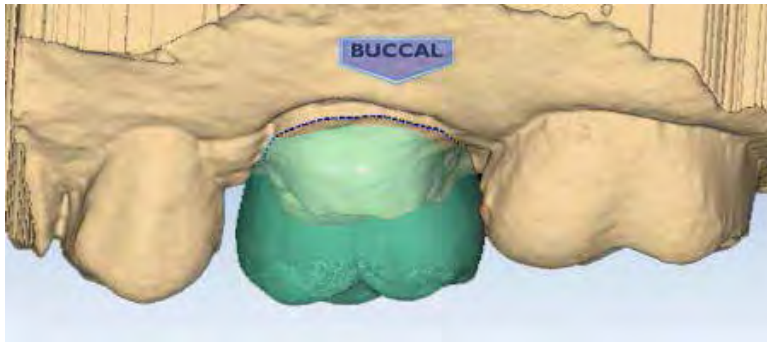
5   From the distal, are the cusp tips in parallel alignment? Since the preview tooth usually sits higher than the adjacent teeth, it will not follow the curve of spee.
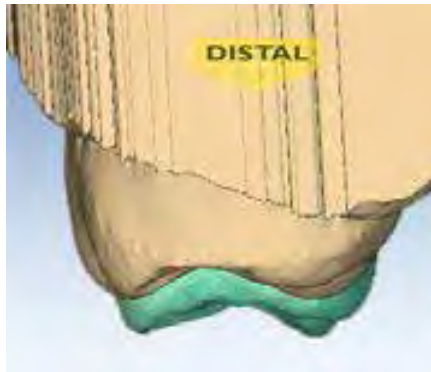
6   Make any necessary changes to the Orientation.

7   When satisfied with the alignment, click **Orientation** to accept the current position.

Resetting the Orientation

The Orientation can be Reset at any time. If there are multiple restorations, the Reset will only affect the tooth of the currently selected tab. Clicking Reset moves the model into position based on the first scan.

Rotating the model

In this example, the model is facing the wrong direction. If the scanner is not pointing towards the distal on the first scan, the surface indicators will be backwards. This is easily fixed with Orientation.
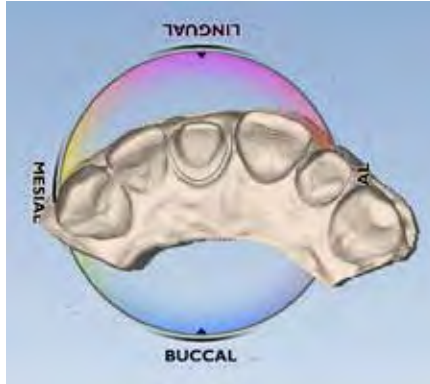
1   Click the **Facial** arrow.

2   Click and drag the mouse in a sideways motion multiple times to turn the model around.
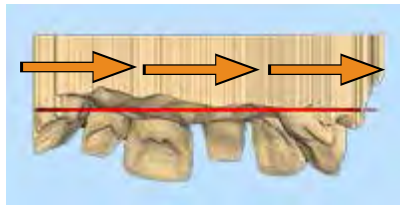
Before   *After - model is facing the other way*

3   Continue with the normal Orientation workflow.

Multiple Restorations

A different Orientation is assigned to each restoration. The curve of Spee affects the orientation of each restoration.

The default orientation is based on the first scan. In the case of multiple restorations, the basic scanning technique starts with the distal proximal neighbor. See "Scanning Multiple Restorations" on page 66 for more information.

*Default Orientation is based on the first scan
(circled in orange on the examples above)*
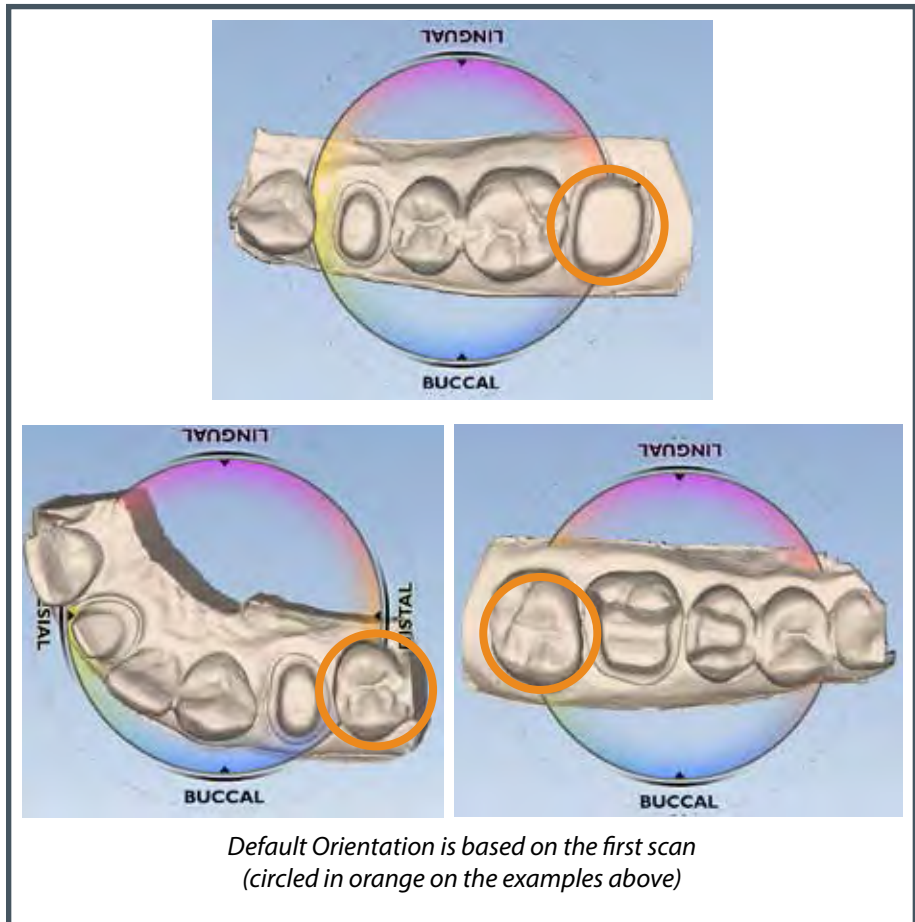
The system displays the model with the lingual side facing the top of the screen. The tooth number tabs are in the same left-to-right order as the teeth on the model. In the example below, Tooth 8 (1-1 ISO) is the first tooth.
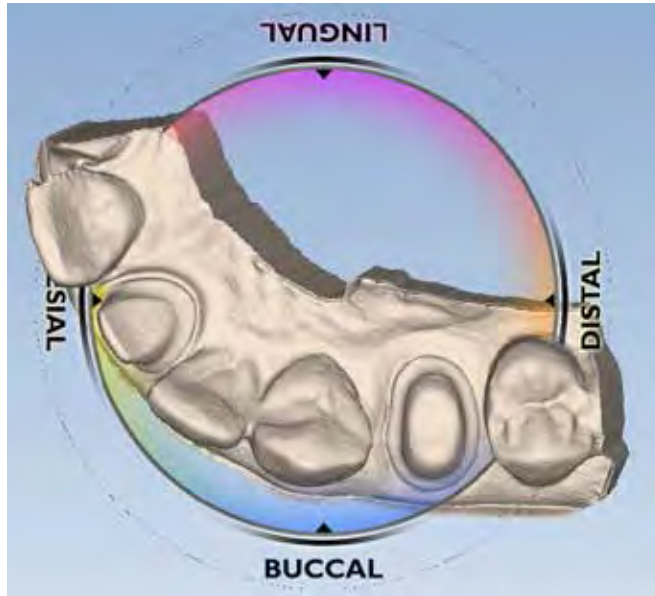
The model rotates around the central point of the orientation circle. The model can be moved so that an individual preparation is at the center of the circle. This is an optional step which can make it easier to alter the orientation for each restoration.

1   Click and hold the scroll wheel. Drag the model until the first tooth is centered in the middle of the screen. The circle graphic moves with the model, but you can see the model moving in relation to the tabs at the top of the screen. When the scroll wheel is released, the circle graphic refreshes and moves to the center. Repeat as necessary.
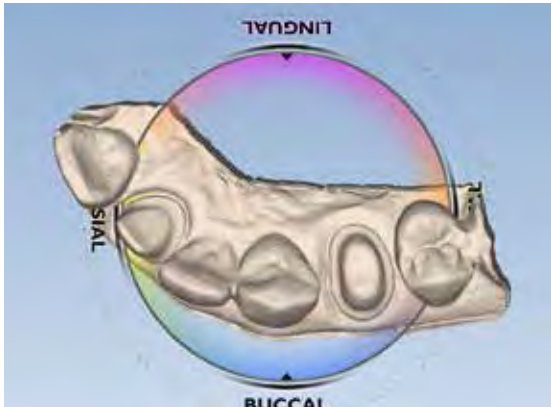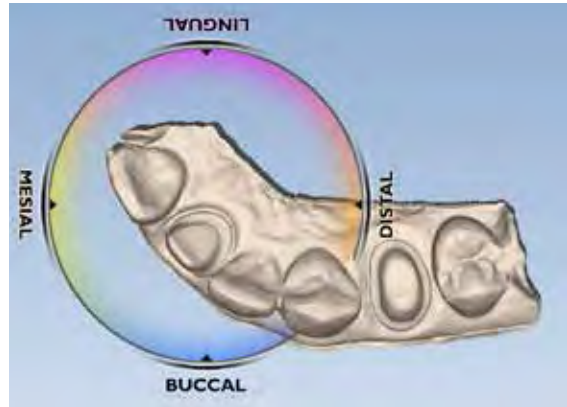
Moving with scroll wheel held down   *After scroll wheel is released*

2 Rotate the model to get the correct Orientation for the first tooth. When satisfied, click **Orientation** to accept.

> **Note:** If you cannot use the distal or mesial view to make the adjustments due to the length of the model or the malalignment of the teeth, make all of the adjustments from the occlusal view.
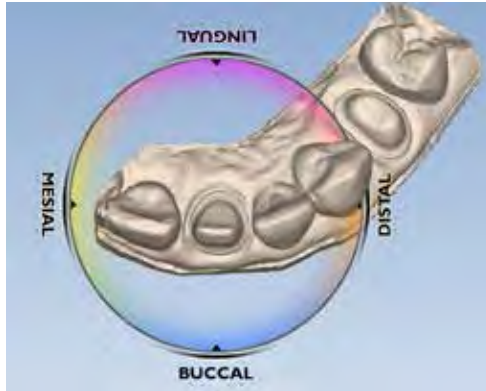
3 Click the tab for the next tooth.

The model reorients back to the original orientation. If you click back on the previous tab, the model will shift to the path for that tooth.

4 While on the second tab, click **Orientation** to designate the orientation for the second preparation.

5 Drag the model so that the second preparation is centered.

6 Rotate the model to the correct orientation.
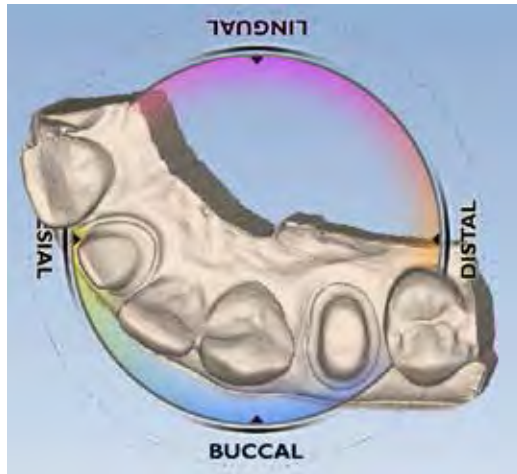
7 Click **Orientation** to accept.

Clicking on each tooth's tab moves the model to that tooth's orientation.
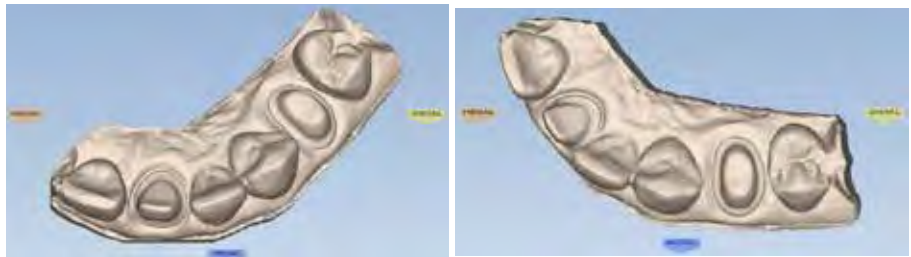
Note: The model is centered on the original central point regardless of which tooth you have selected.

7 *Margin Tab*

The Margin tab contains tools for quickly and easily creating and modifying the margin.

There are three tools on the Margin tab.

- Margin Tool
- Selection Area Tool
- Pre-op Editing Tool

Margin Tool

Clicking the **Margin Tool** activates the margin editing mode in which various methods are available to create and edit the margin.

There are three aids available when working with the margin:

- View ICE Preparation
- Show Features
- Toggle Margin

There are three options for creating your margin:

- Paint - Create the margin using a broad brush stroke.
- Trace - Create the margin using individually marked points along the edge.
- Lasso - Create the margin by marking several points along the edge

> **Note:** You can zoom and rotate the model while you are creating or editing the margin.

After the margin is created, it can be edited using one or both of the following:

- Add Segments - Replaces existing segments of the margin.
- Move Margin - Adjusts the curve of the existing margin.

Margin Aids

View ICE Preparation

For intraoral cases only.

Use **View ICE Preparation** to toggle between ICE view and stone view.
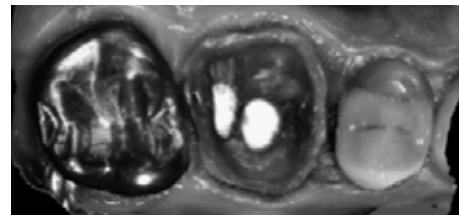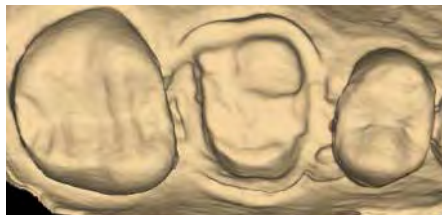
Show Features

Click **Show Features** to highlight high contour areas in green. This can be helpful in finding the margin edge on supragingival preps, inlays, and onlays.

Creating the Margin

When creating the margin, use either the Paint, Trace, OR Lasso tool. They are not used in combination.

Paint tool

The Paint tool is recommended for supragingival margins.

1   Click the **Paint** tool.

The pointer changes to ✐.

2   Hold down the mouse button and drag the Paint tool around the scanned prep to highlight the outer margin edge. The margin doesn't have to be perfect, but gaps must be avoided.
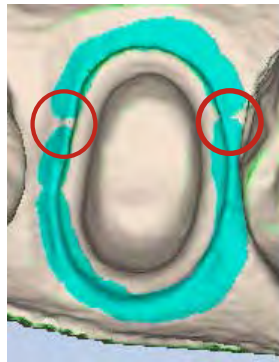
3   Click the **Paint** button again.

The system automatically draws the margin.

4   To delete the margin and start over, click the **Paint, Trace,** or **Lasso** button.
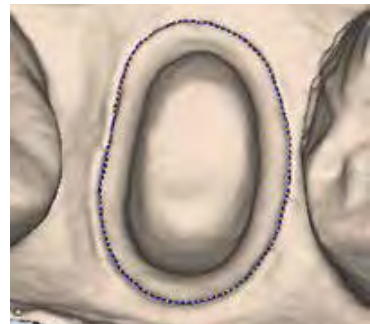
Trace tool

The Trace tool can be used on any margin, but it is especially recommended for equigingival and subgingival margins.

1 Click the **Trace** button.

The pointer changes to ![pen cursor].

2 Click **Show Features** to highlight high contour areas in green.

3 Zoom in and rotate the model until there is a good view of the margin.

4 Position the Trace tool in the middle of the green high contour indication on the margin.

> **Note:** Show Features is recommended as an aid in finding the edge of the margin, it is not necessary for using the Trace tool. Draw the margin in the middle of the green high contour indication.
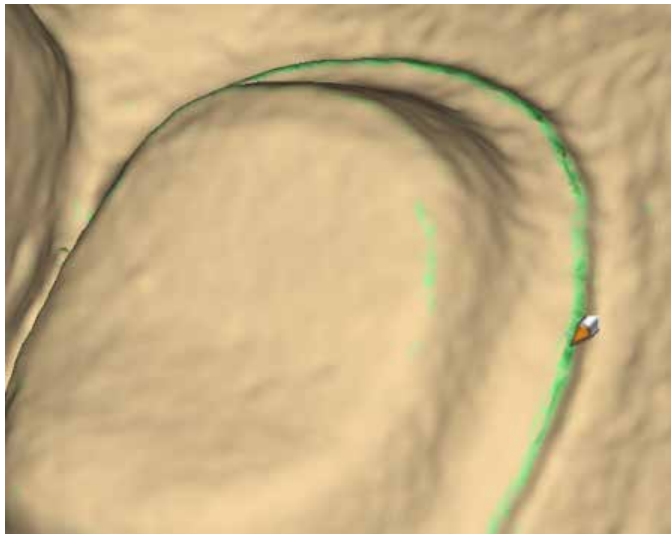
5 Click on the margin. A dot appears as the starting point.

6   There are two options when drawing the margin with Trace.

  • Click along the margin in small increments. The system creates straight lines between each click.

  • Hold down the left mouse button to draw a continuous line. Release the mouse at any time to stop. This requires a steady drawing hand with the mouse and is not recommended for beginners.

  If desired, switch between small clicks and continuous lines.

7   Click the starting point to finish the margin. The system automatically changes the trace line to a margin line.

  Your margin should resemble the following.
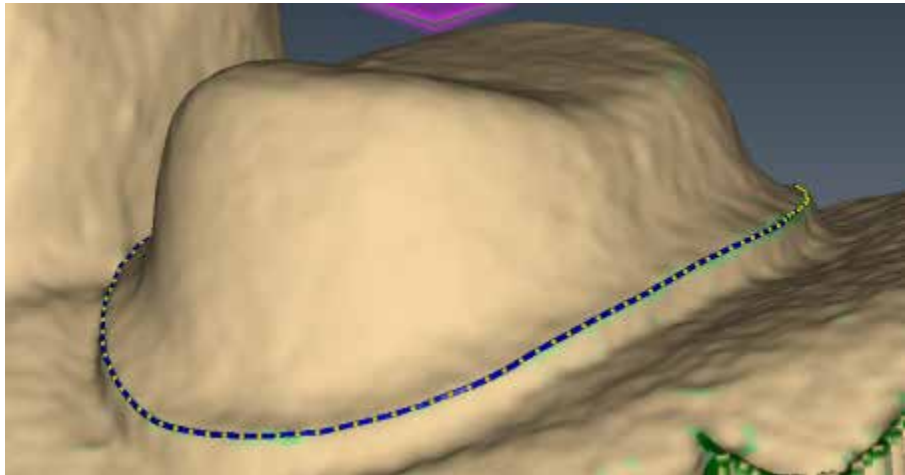
8   To delete the margin and start over, click the **Paint, Trace,** or **Lasso** button.

Lasso tool

The Lasso tool is recommended for partial restorations and supragingival margins with a sharp edge.
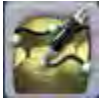
1 Click the **Lasso** button.

   The pointer changes to ![pointer icon].

2 Click along the margin at large intervals. The system creates a line along the edge between each click.

   The starting point and the most recent point clicked appear as blue dots.

3 Click to accept the previewed segment. Click the starting blue dot to finish the margin.

4 To delete the margin and start over, click the **Paint, Trace,** or **Lasso** button.

   Note: If Lasso is having trouble finding the margin, you can change the ICE Margin Mode to Texture Only. See below.

Margin Tab Settings

ICE Margin Mode

For intraoral cases only.

ICE Margin Mode determines which view the system uses to create the margin curve when using the Lasso tool.

1 Click **Settings.**

2 Click **ICE Margin Mode.**

   The default setting, **Normal,** means that the system uses both the stone and ICE view to determine where the Lasso line should appear.

3 Select **Texture only** to indicate that the system should ignore the stone model and focus on the differences in the ICE view. If **View ICE Preparation** is deactivated, this setting returns to Normal mode.

4 Click **Save** to save the change or **Cancel** to exit without saving.

Modifying the Margin

The Margin tab provides two tools for modifying an existing margin path: Move Margin and Add Segments.

Before selecting a tool, enlarge and position the model to ensure an optimal view of the margin area. You can use either tool or both sequentially, they do not remove previous changes when clicked like the margin drawing tools.

Toggle Margin

Once the margin is created, **Toggle Margin** shows or hides the margin. This is helpful in verifying the margin has been drawn correctly.

Move Margin tool

Use the Move Margin tool to drag and drop a section of the margin into a new position.

1 Click the **Move Margin** button.

2 Position the pointer on the margin; click and hold down the mouse button.

> **Note: Area of Influence -** Change the tool's area of influence by dragging the yellow button to increase or decrease the size of the ellipse.

3 Drag the margin onto the margin shelf and release the mouse button.

The system automatically redraws the margin in the new location.

4 Repeat as needed.

Add Segments tool

Use the Add Segments tool to redraw a portion of the margin.

1   Click the **Add Segments** button.

2   Start by clicking on a portion of the margin line that is acceptable. Then, click to add new points across the gap in the line. A line traces where you click. Use multiple clicks to create a curve.
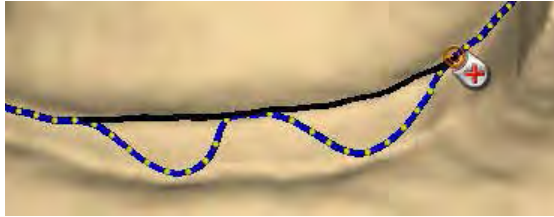
3   Click **Add Segments.** The system redraws the margin and removes the unacceptable section.

4   Repeat as needed.

Preview Library

Click **Preview Library** to display a preview of the library tooth on top of the preparation. The size of the preview tooth is based on the margin. The tooth may appear small on partial restorations. The preview tooth is positioned according to the Orientation. Click Orientation to use the library tooth as a guide to change the model's alignment.

Retract

Use the Retract tool on STL export cases with a subgingival or equigingival margin. This tool ditches the 3D model since the margin line does not convert to STL.

> **Note:** ICE View is not converted to STL format and cannot be used as a visual aid by the recipient of your case.

Without virtual ditching, the margin may be difficult for your recipient to see.
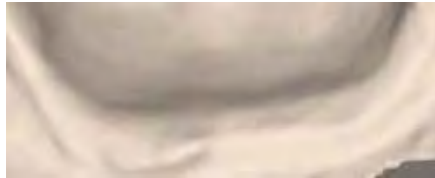
1 After the margin has been drawn and edited, click **Retract.**

The system virtually removes part of the model outside of the drawn margin.

Margin drawn
No ditching
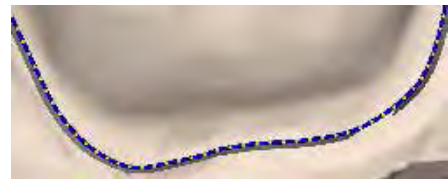
Margin drawn
With ditching

> **Note:** Any changes to the margin will require the ditching to be redone. If you are doing a multiple restoration case, finish all of the margin edits before using the Retract tool.

2 Click **Toggle Margin** to view the ditched area without the margin. This is similar to what your STL recipient will see.
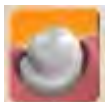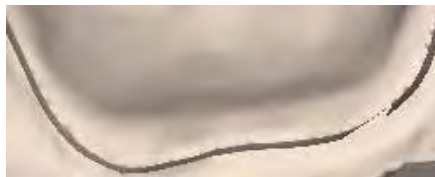
3 Click **Toggle Retraction** to show/hide the virtual ditching.

Multiple Restorations

On multiple restoration cases, the tooth number is assigned to each preparation when the margin is drawn.

1　Click the desired tooth number tab.

2　Draw and edit the margin for the selected tooth number.

3　Select the next tooth number.

4　Draw and edit the margin for the selected tooth number.

Drawing the margins is how the tooth number is designated for each preparation. If the wrong tooth number is selected when a margin is drawn, the margin must be marked again on the correct tooth tab.

> **Note:** See the Bridges chapter for information on drawing pontic margins.

Selection Area Tool

For designing systems only.

As soon as the margin is drawn on an inlay or onlay, one of the following messages appears. If you do not want this reminder to appear in the future, select **Do not show this message again.**
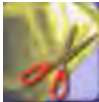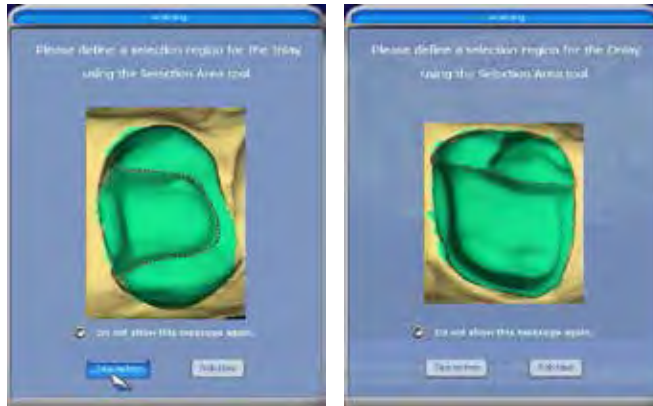
1   Click **Take me there.**

The system takes you to the Selection Area screen. The Selection Area options appear at the bottom of the screen.
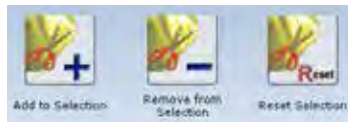
2   Click **Add to Selection.**

3   Click and drag a circle around the entire tooth. After you let go, an area is highlighted. Do not go too far beyond or short of the natural tooth or the proposal will be distorted. This process is recommended for inlays, onlays, and window prep veneers.
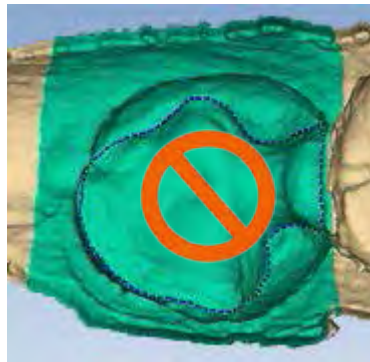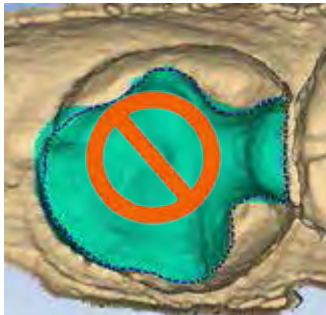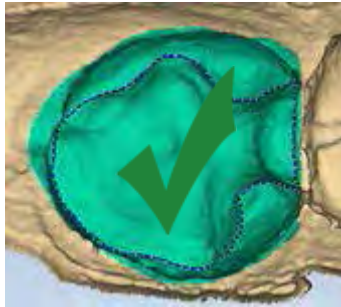
4   When you are satisfied with the Selection Area, click **Margin Tool** to edit the margin.

Remove From Selection

1 Click **Remove from Selection.**

2 Click and drag the mouse to select the areas that you want to remove.
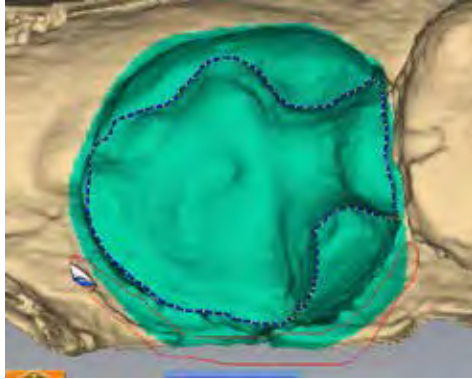
3 Repeat as needed.

4 When finished, click **Margin Tool.**

5 Click **Hide Model** to view your trim region. Hide Model is only available on the Margin tab when a Selection Area has been designated.
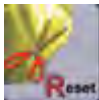
Reset

To remove the Selection Area and start over, click **Reset.**

Pre-op Editing

For designing systems only.

The Pre-op Editing tool is used to designate the area of the pre-op scan that will be combined with the library tooth. This step is not necessary if the pre-op scans are being used as a template only.

1 Click **Pre-op Editing.**

2 To designate the pre-op library surface, use the tools at the bottom of the screen. These act the same as the margin tools.

- Trace - Removes the existing line. Draw a new pre-op area.

- Move Curve - Click to drag an exiting curve into a new position.

- Add Segments - Click to add a new line or curve to the existing area.

Trace

1   Click **Trace.**

2   Click or drag the mouse around the edges of the pre-op to designate the area that you want to combine with the library tooth.

Be sure to only designate areas with good data.
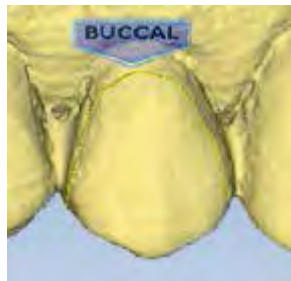
| *Down to the near the gingival tissue* | *Occlusal cap only* | *Partial tooth - often used when original anatomy is chipped* |
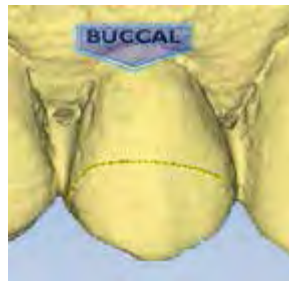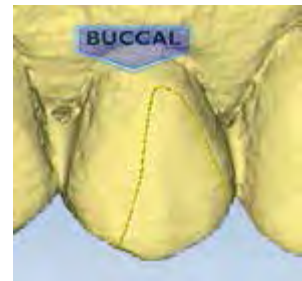
3   Click on the blue dot to finish the pre-op area. The software automatically changes the trace line to a margin line.

Move Curve
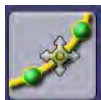
1   Click **Move Curve.**

2   Click and drag the curve into the desired position.

3   Release the mouse button to view the new occlusal area line.

Add Segments

1   Click **Add Segments.**

2   Start by clicking on the portion of the line that is good. Then, click to add new node points across the gap in the line. A black line traces where you click. Use multiple clicks to create a curve.

3   Click **Add Segments.** The system redraws the pre-op area line and removes the bad section.

4   Repeat as needed.

8 *Designing the Restoration*

After you have scanned the preparation and defined the margin, the Design tab provides an array of tools and options to customize the proposal.
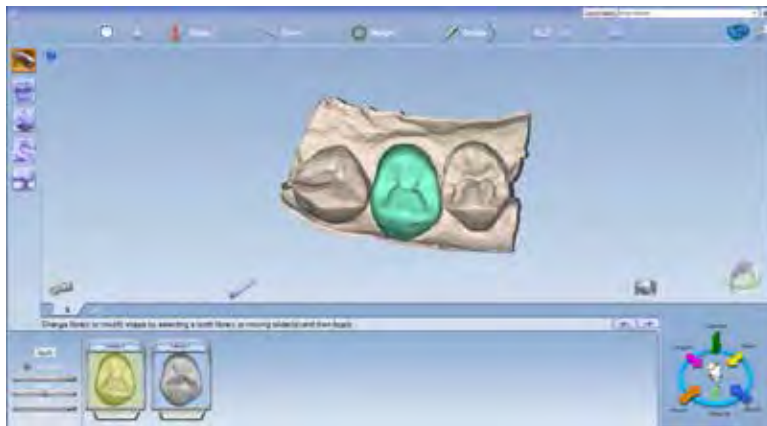
Select from the design tools on the left menu, each of which provides additional options in the box below the restoration:

- Tooth Libraries
- Spacer Tool
- Incremental Change Tools

- Freeform Change Tools
- Contact Refinement

Tooth Libraries

On the Design tab, the system defaults to the Tooth Libraries page. You can change the tooth library that was selected earlier in the Setup tab. This may be useful to find a better match with the actual anatomy. You can also resize/move the preview tooth, change the anatomy levels, and/or deactivate Autogenesis for this restoration.

The library thumbnails appear in the Options box below the restoration. A green preview tooth display. The selected library is highlighted in yellow.
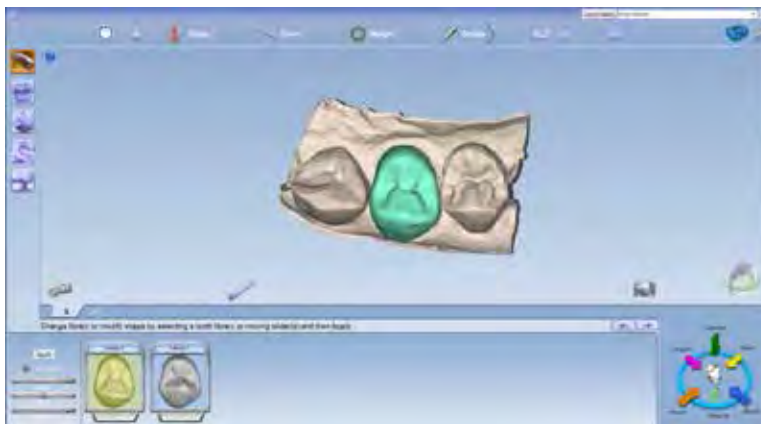
Select a Library

If desired, click another library to view the preview tooth. Select the library with the closest anatomy.

Resize the Library Tooth

The preview tooth can be resized to aid in Autogenesis.

Hold down the ALT key and use the UP or DOWN arrows to resize the preview tooth. It should be close in size to the adjacent teeth.

Move the Library Tooth

The preview tooth can be moved to aid in Autogenesis.

Click and drag the tooth into closer alignment with the adjacent teeth.

Anatomy Levels

The anatomy levels enable you to deactivate Autogenesis and/or select different anatomy details for this proposal. Most restorations will use the default settings.

> **Note:** The red line on the Detail slider represents the maximum amount of detail that can be milled into the restoration.

1   If desired, use the sliders to change the amount of **Detail, Slope,** and/or **Wear.**

2   To deactivate Autogenesis, clear **Autogenesis.**

Apply the changes

3   Click **Apply** if any changes have been made to the library, Autogenesis activation, or anatomy levels.

Pre-op as Library Tooth

When Pre-op is selected as the Library tooth, Autogenesis combines the Pre-op selection with the Library A tooth. Use the following steps to move or resize the Library A tooth to modify the proposal, if desired.

1   Click **Tooth Libraries.**

The Pre-op selection preview displays as green. Library A tooth displays as dark red.
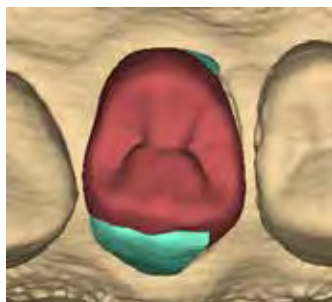
Move and/or resize the library tooth to be a closer match to the Pre-op selection.
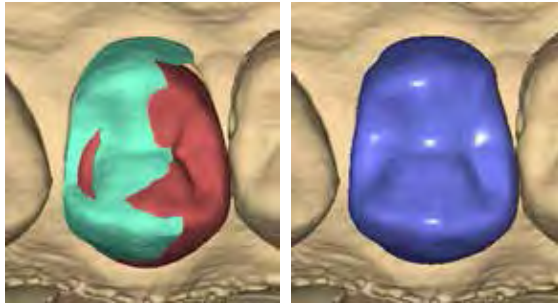
2   Click **Apply.**

3   Repeat as needed.

Viewing Options

The Design tab contains additional viewing options to aid in optimizing the design that appear below and to the right of the restoration. These functions can be used with most of the tools listed above.

Hide Model

Click to show or hide the adjacent teeth. This is especially helpful when adjusting the contact area.

When Hide Model is activated on partial restorations, the area that remains is the area that was designated as the Selection Area. Rotate the proposal. Depending on the designated selection area, you may see holes. These are usually not a deterrent to the design process. If desired, return to the Margin tab and edit the Selection Area.
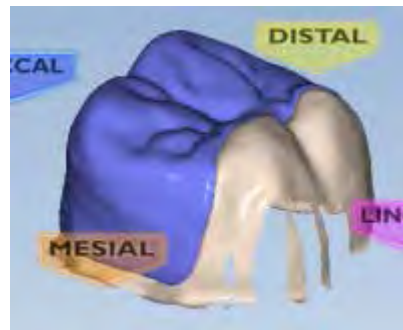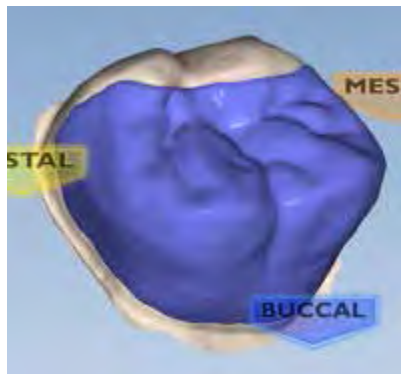
Material Thickness

Clicking Material Thickness alternately shows and hides the material thickness indicators in the Design tab.

When Material Thickness mode is active, the system colors the proposal based upon material thickness at each point on the restoration and displays a legend to indicate the thickness associated with each color.
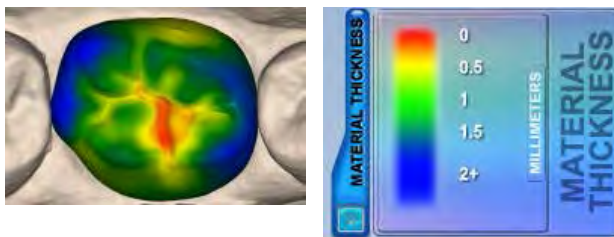
For Your Information

The thickness shown represents the shortest distance to the preparation (green line) and not necessarily the vertical thickness at that point (red line).
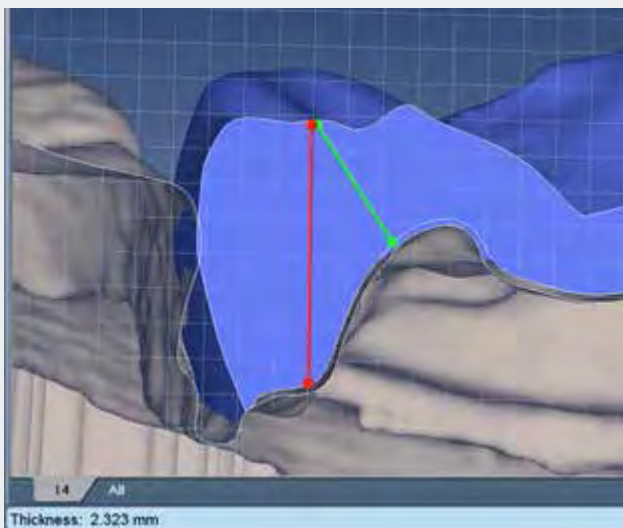
Use Slice Place and the measuring grid to calculate the thickness of other areas.

Measure

Click the **Measure** button and click anywhere on the proposal to see the material thickness measurement displayed in the information bar.

> **Note:** Measure does not have to be used with Material Thickness.

View Contacts

Clicking **View Contacts** alternately shows and hides the strength of contact between the restoration model and adjacent dentition. Use **Hide Model** to remove the adjacent dentition from view.

When View Contacts is active, the system colors the proposal based upon contact strength at each point on the restoration and displays a legend to indicate the measurement associated with each color.
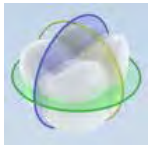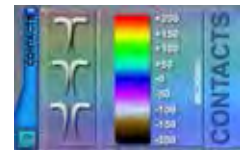
Slice Plane

Slice Plane enables you to view the restoration along various cross sections. This is especially helpful in optimizing material thickness and contacts.
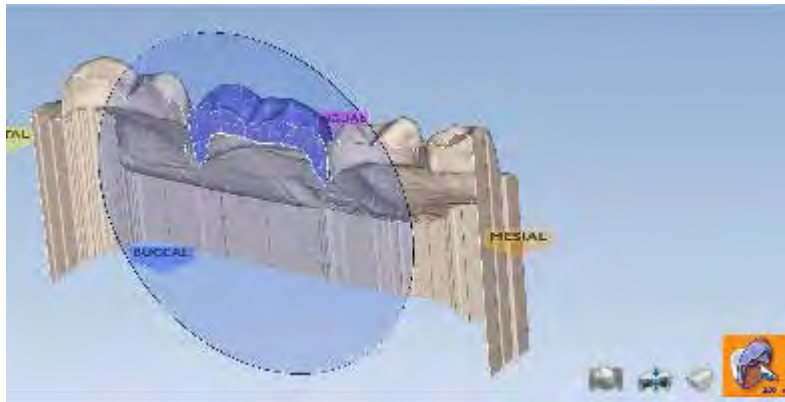
Each time you click Slice Plane, you see a different cross section.
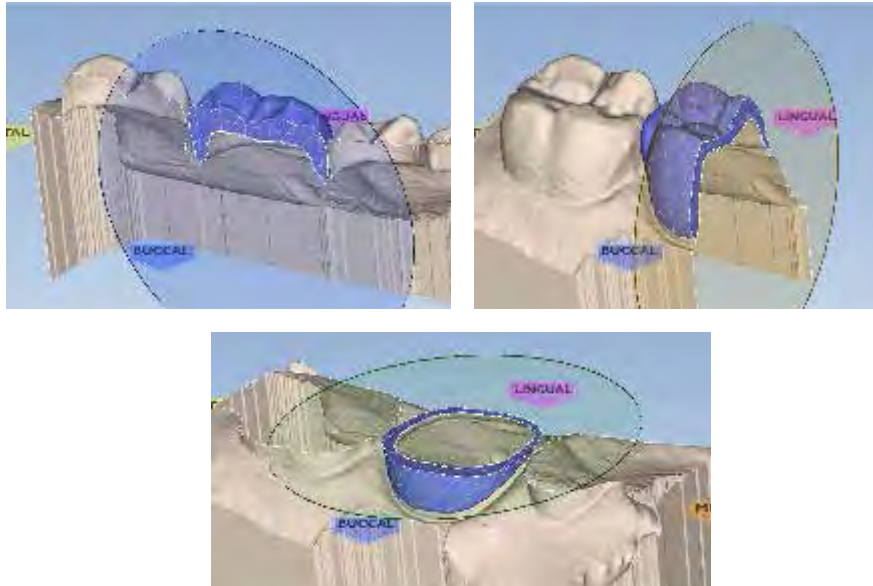
Rotate the image to see the cross section.

The Slice Plane button shows the measurement represented by the grid lines. Zoom in or out to change the measurement. Zooming in will decrease the measurement. Zoom out will increase it.

View Bite Registration, Opposing Model, or Pre-op

If a bite registration, opposing model, or pre-op was scanned, it can be viewed anytime during the designing process.

1   Click **View Pre-op** or **View Bite Registration.** Click **View Bite Registration** to view the opposing model.

2   The pre-op (yellow) or bite registration/opposing model (blue) template appears on top of the restoration.

Pre-op

Bite Registration
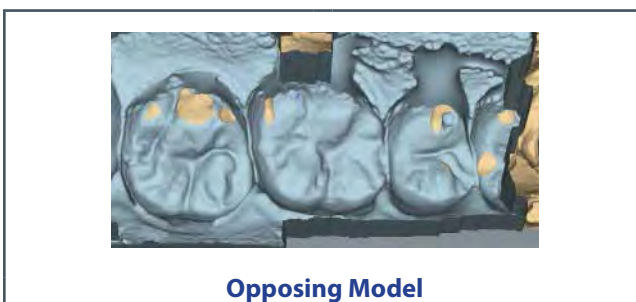
Opposing Model

To make the template translucent, click **View Pre-op** or **View Bite Registration** again. Use the slider to adjust the transparency of the template.
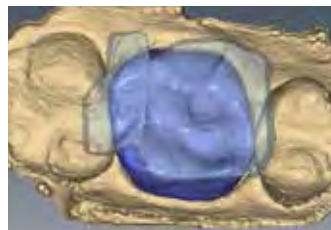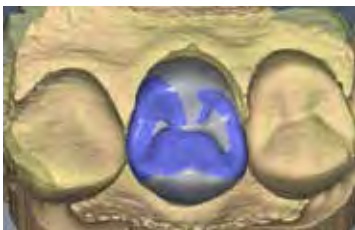
3   Use the pre-op, bite registration, or opposing model to aid in your design of the restoration's anatomy.

4   Click again to remove the template from view.

Incremental Change Tools

Use the Incremental Change Tool options to move, rotate, or expand the restoration's occlusal table while leaving the margin intact.

Click **Incremental Change Tools** on the left most menu.

The Incremental Change options appear.
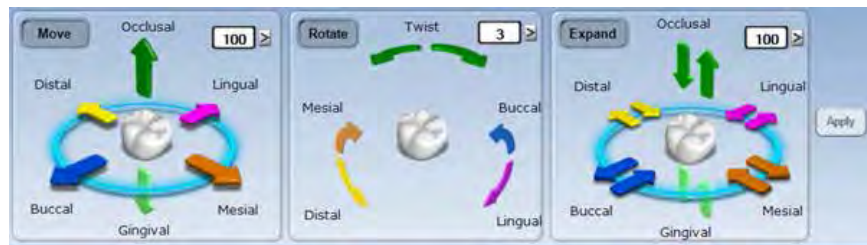
> **Note:** The pictures for rotating, moving, and expanding the restoration use exaggerated examples to help illustrate how the tools work. These examples do not represent realistic restorations.

The recommended order is as follows:

Rotate

The Rotate controls use a numerical rotation angle field in conjunction with three pairs of rotation arrows to rotate the occlusal table about a selected axis.

1   Use the number field or pop-up list to set the rotation angle in degrees.

2   Click the desired rotational direction arrow to rotate the occlusal table the specified number of degrees in the desired direction.

Move

The Move controls are for overall movement and use a numerical distance field in conjunction with six directional arrows to move the occlusal table.

1 Use the number field or pop-up list to set the movement distance in microns.

2 Click the desired directional arrow to move the occlusal table the specified distance and desired direction.
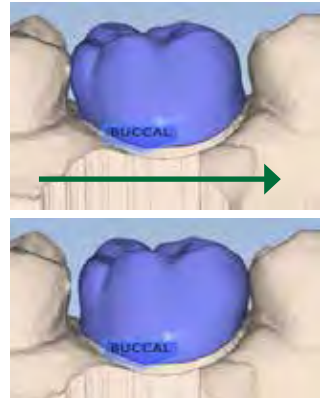
Expand

The Expand controls are for fine movement and use a numerical field in conjunction with six pairs of arrows to scale the cervical cap in a given direction. This is different from Move and Rotate controls that move the cervical cap as a unit.

1 Use the number field or pop-up list to set the expansion in microns.

2 Click the desired directional arrow to expand or contract the restoration the specified amount in the desired direction.
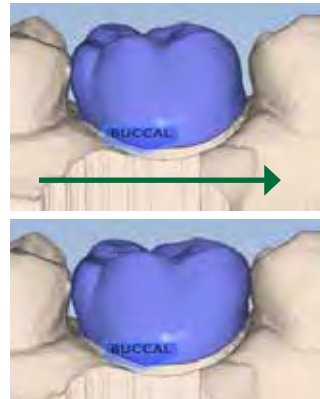
Freeform Change Tools

The Freeform Change Tools options enable you to modify the restoration in an unrestricted manner rather than the defined increments of the Incremental Change tools.

> **Note:** The pictures for freeform changes on the restoration use exaggerated examples to help illustrate how the tools work. These examples do not represent realistic restorations.

> **Note: Area of Influence -** Change the tool's area of influence by dragging the yellow button to increase or decrease the size of the ellipse.
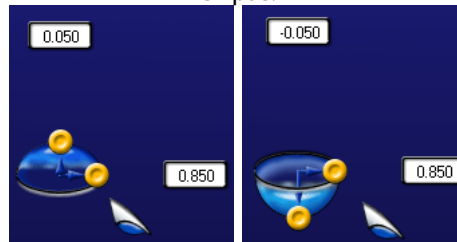
1   Click **Freeform Change Tools** on the left most menu.

The Freeform Change options appear.

- Rubber Tooth

- Dropper

- Move Cusp

- Smooth Surface

- Move Margin

- Define Feature

Rubber Tooth

Use the Rubber Tooth tool to change the form of the restoration by pushing or pulling inward or outward on the restoration. In this example, the tooth was pulled in the direction of the arrow.

1   Click the **Rubber Tooth** tool.

2   Click and hold down the left mouse button on the part of the restoration that you want to change. The area that will be affected turns pink.

3   While holding down the left mouse button, drag the cursor in the direction that you want the restoration to move.

     Small moves are recommended. Rotate and zoom as needed to view the changes.

4   Click **Undo** to remove changes.
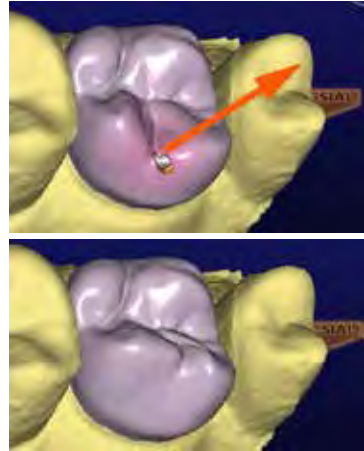
Dropper

The Dropper tool adds/removes virtual beads of material to/from the restoration, analogous to placing beads of liquid wax on a cast model. The vertical axis of Area of Influence determines whether the material is being added (positive number) or removed (negative number).
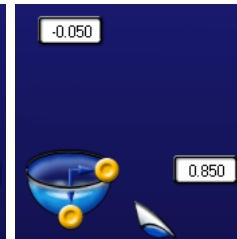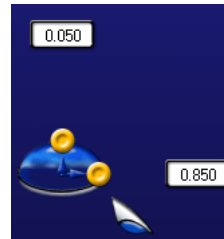
1   Click the **Dropper** tool.

2   Ensure **Material Thickness** is activated. This is the best way to see the effect of the dropper. To speed up the process, leave Material Thickness deactivated.

3   Position the pointer where you would like to add/remove beads of material to the restoration.

4   Click and release the mouse button. Rotate and zoom as needed to view the changes. Click and hold while dragging to make a line of material.

5   Repeat, as necessary.
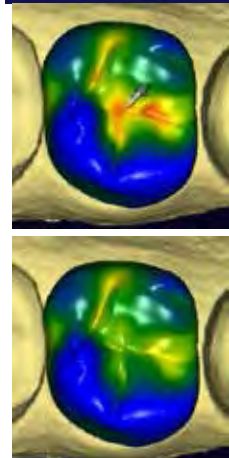
6   Click **Undo** to remove changes.

Move Feature

Use the Move Feature tool to modify a cusp, marginal ridge, or the occlusal table.

1   Click the **Move Feature** tool.

Each anatomical feature is now represented by a different color.

2   Click the desired feature to activate it.

The selected feature is highlighted.

3   Click and drag the feature to the desired position.

Or, use the Control arrows to move the selected feature.

Small moves are recommended. Rotate and zoom as needed to view the changes.

4   Click **Undo** to remove changes.

Smooth Surface

Use the Smooth Surface tool to make an area of the proposal's surface more uniform.

1   Click the **Smooth Surface** tool.

2   Click on the desired area to smooth it.

Small, gradual changes are recommended. Rotate and zoom as needed to view the changes. Click and hold while dragging the mouse to make continuous changes.

3   Click **Undo** to remove changes.
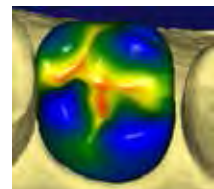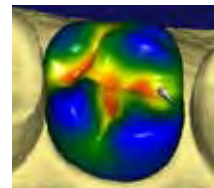
Move Margin

The Move Margin tool allows you to make minor margin adjustments without losing the design work.

1   Click the **Move Margin** tool.

    The restoration becomes translucent.

2   Position the pointer on the margin line.

3   Click and hold down the mouse button.

4   Drag the margin into the new position and release the mouse button.

    The system automatically redraws the margin in the new location.

5   Click the **Move Margin** tool to see the solid restoration view.
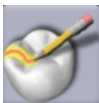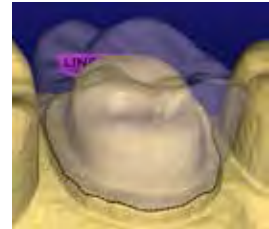
Define Feature

Use Define Feature to add anatomical features to the restoration. Multiple features can be drawn and moved simultaneously.

1   Click **Define Feature** and trace the feature on the restoration proposal.

2   Use the arrow controls to move the feature line(s) in the desired direction.

    As an alternative, use the **Rubber Tooth** to pull or push the feature to the desired position or shape.
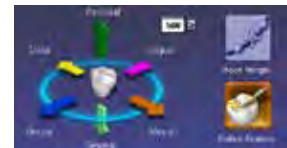
Paint Feature

Use Paint Feature to designate an area of the proposal that you want to move. This is often used to designate a contact area that you want to move.

1   Click **Paint Feature** and paint the desired area of the proposal.

2   Use the arrow controls to move the highlighted area in the desired direction.

    As an alternative, use the **Rubber Tooth** to pull or push the feature to the desired position or shape.
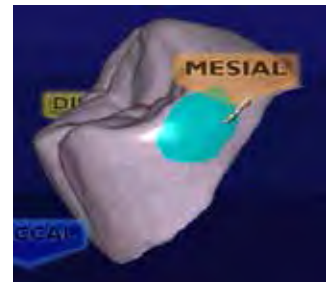
Contact Refinement

Contact Refinement enables you to set the strength of the occlusal and/or interproximal contacts. It also enables you to broaden the interproximal contacts by making the proposal more square.

1. Select the desired **Strength** for the **Bite** and/or **Contacts.**

2. There are two ways to make the adjustment to the selected strength.

   • Click **Refine** to automatically change the occlusal table or the interproximal contacts.

   • Circle the desired area.
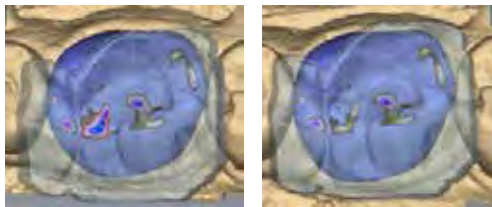
Another way to change the interproximal contacts is to make the proposal more square.

3. Click **Occlusal** in View Controls.

4 Click **Broaden Distally** and/or **Broaden Mesially** to make the proposal more square. This will usually be utilized on posterior crowns.

> **Note:** The **Broaden** buttons change the proposal in set increments. It is not connected to the selected Strength.

Be careful when using this feature. Overuse will make the proposal too square. See the exaggerated example below.

5 Click **Undo** or reapply the library tooth to remove the changes if desired. If the library tooth is applied, ALL design changes will be lost.

Spacer Tool

You may use the Spacer Tool to override the default spacer thickness and margin ramp values.

Spacer thickness is the space between the restoration and the preparation. The tool has separate settings for the axial and occlusal walls.

Margin ramp is the contact zone for the margin.

Use the sliders or pop-up menus to change the values.

Design Tab Settings

Click **Settings** to select which features Autogenesis uses, to enter the default Bite and Contact Strengths, and to use Margin Boost.

Autogenesis Settings

Each type of restoration has the option of different settings.

By default, Autogenesis uses all of the options when creating a crown. Inlays and Onlays have Contacts and Occlusion selected. All of the options are deselected for Veneers. Select which settings you desire for each restoration type.

Contact Strengths

Contact Strengths designates the default strength of the Proximal Contact and Occlusal Contact in Autogenesis and Contact Refinement.

For Your Information
Autogenesis may not create an interproximal contact if the proposal makes contact with gingival tissue, as illustrated in the example below. In these cases, you must create the contact manually.
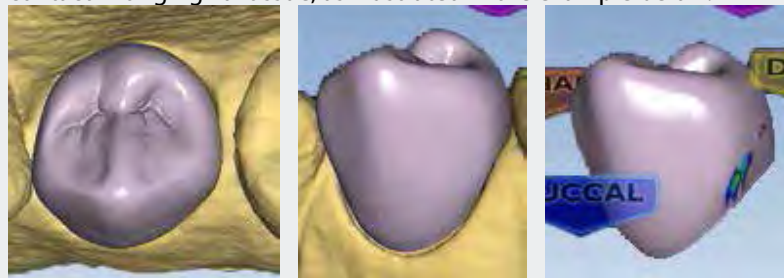
Margin Boost

Margin Boost setting enables clinical operators to increase the thickness of the proposal around the margin. Margin Boost is OFF by default.

Use Margin Boost Settings to designate the default margin boost for each restoration type.

The controls are similar to the Dropper tool. The Area of Influence (blue bubble) affects the width and thickness of material added. The width is represented by the horizontal arrow, 1.000 in the example. The thickness of material is represented by the vertical arrow, 0.100 in the example. The vertical slider on the right is the height of the material added. This is generally kept towards the bottom, near the margin.

The effects of this tool are most easily seen on pre-op cases where there is a gap between the margin and the pre-op template, however this tool can be used on all cases to ensure sufficient material thickness and avoid chipping during milling.

Default Pre-opAutogenesis™ - No Margin Boost

Autogenesis with Margin Boost

Make any desired changes to the Margin Boost. In Tooth Libraries, click **Apply** to regenerate the proposal with the new settings.

The settings are saved for the next proposal.

Note: Margin Boost is recommended over the use of Margin Thickness.

Designing Multiples

On cases with multiple proposals, click the desired tooth number tab to designate which tooth is being designed.

The ALL tab enables certain design tools to manipulate every proposal at the same time or activates all proposals at the same time to enable individual manipulation without switching tooth tabs.
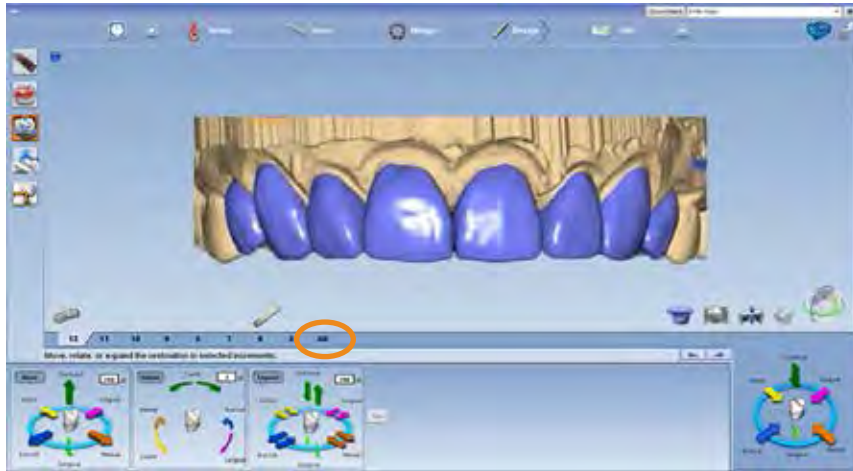
Manipulate ALL proposals at the same time

Incremental Change Tools

- Move

- Rotate

- Expand

Manipulate individual proposals without switching tabs

Freeform Change Tools

- Rubber Tooth

- Dropper

- Smooth Surface

Note: When using the Incremental Change tools, The margins do not adjust to the new position until Apply is clicked or another tool is selected.

9 *Mill Tab*

On the Mill tab of the design software:

- select a block

- choose a size and location for the sprue

- position for the restoration in a multiblock

- specify tool path settings

- view mill simulation

- send the design data to the mill

At the mill, you will load the block, ensure the milling tools are in place, verify the fluid is at the correct level, and then start the mill process.

Setting up the restoration for milling

Final restoration setup is done on the Mill tab.
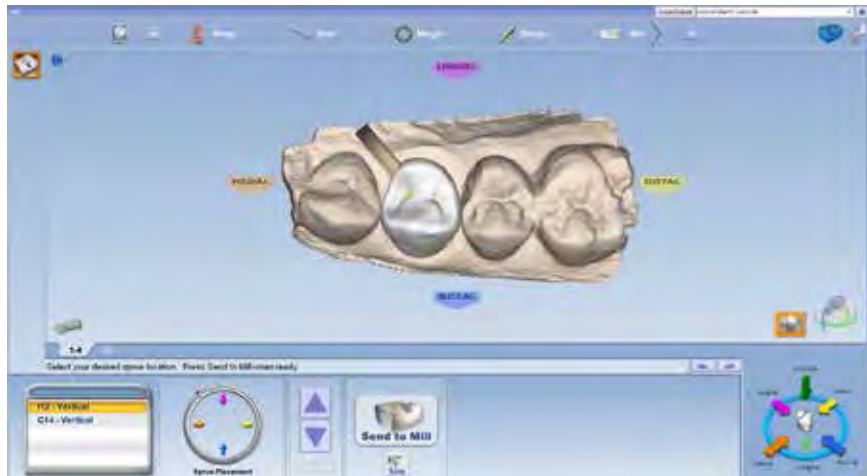
Note: Yellow or red shading on the restoration indicates the material in the shaded area is thin and the material manufacturer recommends adjustment. Return to the Design tab to make changes in material thickness.

Click the **View Model** icon to view or hide the preparation and proximals, if desired.

Select a Block Size

Available block sizes are listed in the Blocks section. A default size is selected. Click on another size if desired. If the restoration will not fit into any of the block sizes available in the chosen material, click **Settings** to select a different material.
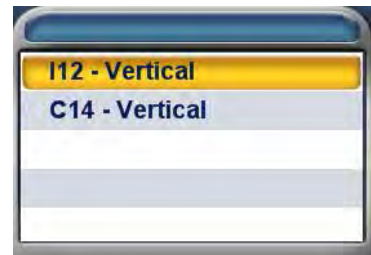
Sprue Placement

The default setting for the sprue can be changed with "Sprue Angle Method" on page 18.

Change the location of the sprue on the restoration, if desired, by moving the placement indicator (circled in orange below) along the circle that represents the exterior of the restoration or by clicking one of the arrows. Recommended locations are as follows.

- Anteriors/posteriors: midway between lingual and the mesial or distal

- Premolars: mesial or distal

- Inlays and Onlays: largest proximal box

Sprue Placement
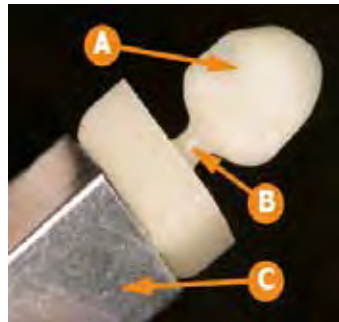
1 Restoration

2 Sprue

3 Mandrel

Note: The sprue is the connection between the restoration and the mandrel.

Rotate and inspect the restoration to ensure the sprue is not positioned on a groove. Move the sprue towards a flatter area of the restoration. This is usually near the interproximal, but should not be put on the contact area unless it is necessary.

Take care in positioning the sprue on inlay and onlay restorations. Ensure the sprue is not attached to an upper surface. Deactivate **View Model** to ensure the sprue is properly placed.
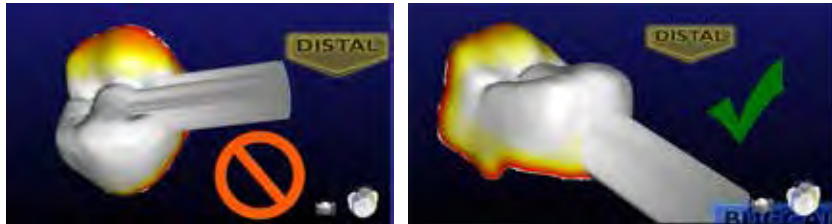
Occlusal Only Inlays

Since occlusal only inlays have no external proximal walls, sprue position can become an issue. There are two options. The sprue can be placed on the internal aspects, but this will result in manual adjustment of the internal fit, which can affect the integrity of the restoration.

The recommended method is to use the dropper tool or rubber tooth tool to "pull up" an area of the occlusal surface and create a raised area on which a sprue can be attached. Manual adjustment of the occlusal surface will be required after milling, but internal fit will not be compromised. For more details or information, contact SOS.

Restoration Positioning

When using an IPS Empress CAD Multiblock, the **Restoration Positioning** arrows are enabled. Use the arrows to move the restoration up or down within the block to achieve the desired shading. Be aware that if the restoration is near the top or bottom of the block, extra milling time will be required to remove the extra material.
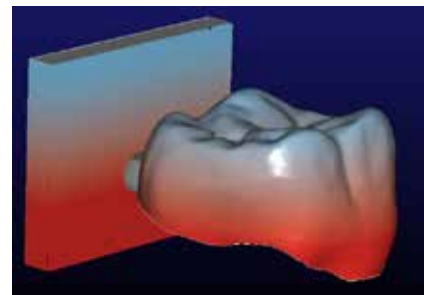
Mill Simulation

The Simulation Mode portrays the milled restoration. It takes about 10 seconds to generate and is recommended before milling to check the internal fit.

If a hang-up is seen, you can increase the spacer or make any other necessary design changes.

1 On the Mill tab, click **Sim** (located under Send to Mill).

2 Confirm the desired setting:

- **Standard** is recommended for full coverage restorations.

- **Detailed** is recommended for partial coverage restorations.

3 Click **OK.**

The system takes a few seconds to create the simulation.

Evaluate the simulation

- Are there hangups? Hangups are areas where the tools cannot completely remove the material for the interior of the proposal.

- Is there overmilling? Overmilling is caused by areas of the preparation that are smaller than the tools. The tools must "overmill" and remove extra material so

that there is no hangup. Is the overmilling drastic enough to cause a loss in retention?

1   Click **Hide/View Model** and click the **Gingival** arrow to view the interior aspect of the proposal.

The simulation will show swirl marks in areas where the milling tools have to overcompensate for small prep areas.

Sharp areas of the preparation that are smaller than the milling tools can result in overmilling.

Swirl marks indicate overmilling. The rest of the proposal's interior is relatively smooth.

2   Click **Hide/View Model** to activate the model again.

3   Click **Slice Plane** once or twice to get the desired slice direction.

4   Drag the slice to the approximate area of the overmilling. Rotate and zoom to evaluate.

Note: A maximum zoom of 1 mm is recommended.

Example A: In the example below, the majority of the spacer follows the contours of the preparation (highlighted in green). There is a section of extra spacer where the tools had to overcompensate for the sharpness of the preparation (highlighted in orange).
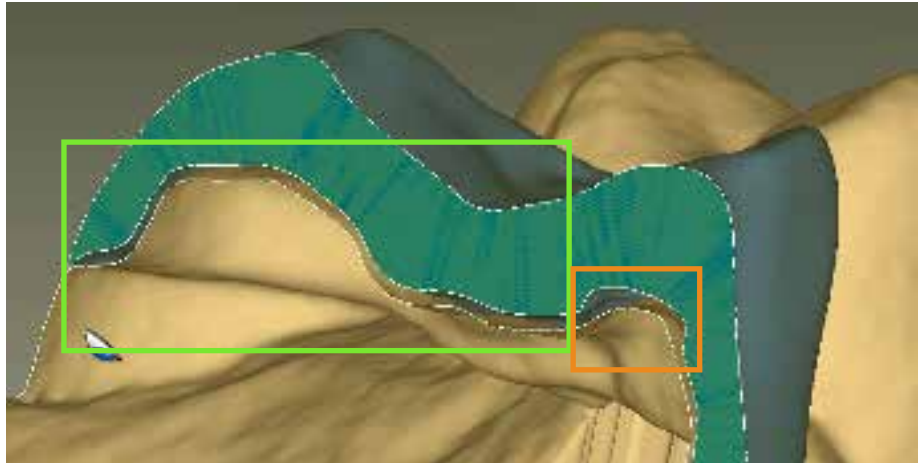
Example B: In the example below, there is large overmilling (orange), minor overmilling (yellow) with only a slight increase in the spacer, and on a different slice of the same proposal, there is an overlap which would cause a hangup (red).

Is there too much overmilling? How much is "too much"? What can be done about a hangup?

Analyzing and fixing these issues requires judgment calls and experience. That is why we recommend calling **Customer Support** at **1.800.537.6070** to have them evaluate your simulation before you mill. If you mill a problematic proposal, you may have too much spacer and loss of retention or you may have hangups and have to adjust the restoration (and mill another block) or adjust the preparation.

Send to Mill

1 Click **Send to Mill** when you are satisfied with the restoration and mill set up.

2 Confirm the desired setting.

- **Standard** is recommended for full coverage restorations.

- **Detailed** is recommended for partial coverage restorations.

Mill Tab Settings

Click **Settings** to change any of the settings listed below.

Network Settings

This should only be changed by a customer service representative. Incorrect network settings will make the design computer unable to communicate with the Job Server and mill.

Material/Shade Settings

The material and shade for the current restoration can be changed here.

Margin Thickness Settings

Select the minimum material thickness along the margin. The recommended margin thickness is 70 to 100 microns to reduce margin chipping or potential short margins.

Milling Settings

Milling Settings only affect proposals with a sharp interior angle, like an anterior incisal edge. If the interior of the proposal is smaller at the tip than the tools in the mill, the **Standard** setting removes extra material at the tip. This may lead to a crown that is too thin at the top. The options are to round the preparation or to select **Undermill.** If **Undermill** is selected, then the mill will go as far as the tool's size will allow and the remainder must be removed manually.
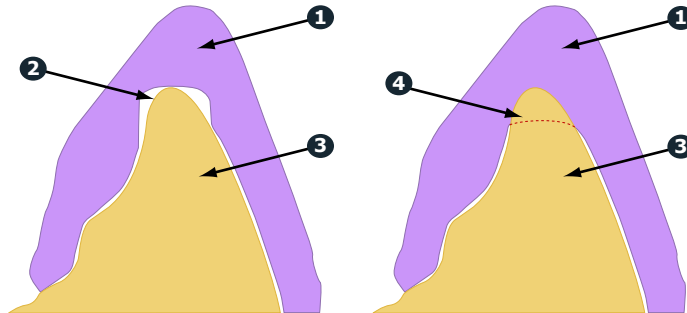
- ❶   Proposal
- ❷   Standard
- ❸   Preparations
- ❹   Undermill

Simulation Settings

Click **Settings** on the Mill tab to view/edit the **Simulation Settings.** The default selection is **Speed.** This will give you a faster simulation. Select **Quality** for a more accurate simulation, but be aware that it will take longer to process. Note that when the design software is restarted, it will return to the default Speed setting.

> **Note:** Mill time is displayed in the information when Quality simulations are processed.

Simulation completed. Total milling time: 16:17.00
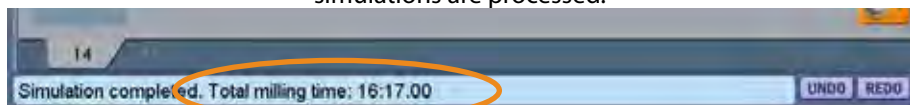
10 *Implant Design*

Implant restorations depend on three things:

- A properly placed implant

- Replication of a natural emergence profile

- Creating a natural, esthetic design of the restoration

The biggest challenge is the emergence profile. On most full coverage restorations, the diameter of the tooth at the prepared margin is only slightly less than the diameter of the proposed occlusal table. In these cases, the software can easily create the axial contours.

The diameter of an implant abutment is often very narrow, so it is an entirely different shape for the software and can be difficult to create a smooth and naturally shaped emergence profile.

In this chapter, we demonstrate several methods for designing the restoration. The best method to design an implant can change from one case to another. If your first attempt at design does not meet your expectations, try another method.

- "Small Preview Tooth Method" on page 134

- "Large Preview Tooth Method" on page 136

- "Extended Margin Method" on page 140

Orientation

If the implant is angled, use the adjacent teeth to evaluate and adjust the Orientation. An orientation based on the adjacent teeth will create the best initial Autogenesis design.
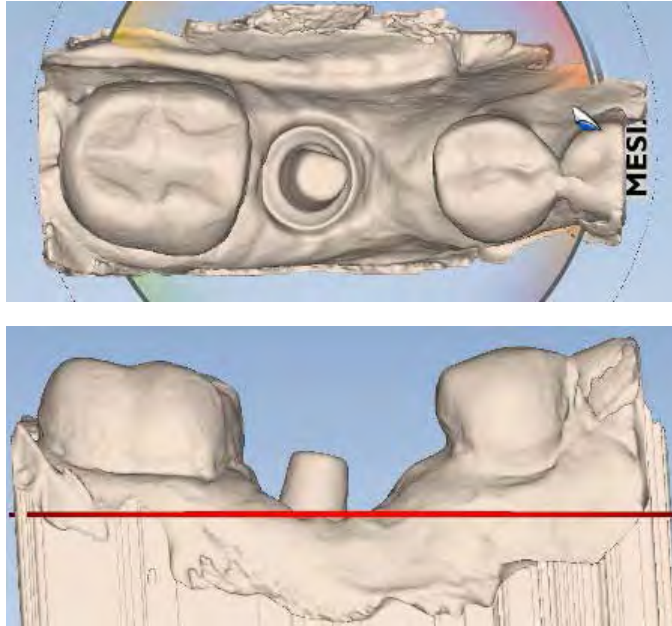
Small Preview Tooth Method

These instructions assume that you have already tried to use the default method and been unable to get a satisfactory initial proposal. This method requires a lot of design work and is not usually recommended.

Margin Tab

1   Click **Trace.** Draw the margin on the collar of the abutment.
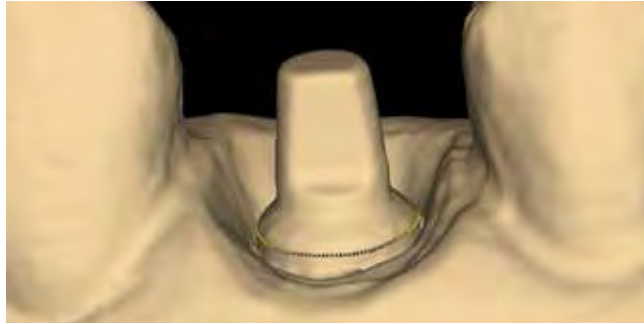
Design Tab

1   Decrease the size of the preview tooth until the margin is close to the size of the margin on the abutment. Hold down the ALT button and use the Down arrow (located under the space bar) to decrease the size of the preview tooth. Use the Up arrow to increase the size.

2   Ensure that the preview tooth is centered in all directions (mesial-distal, buccal-lingual, incisal-cervical) by left clicking and dragging into place.
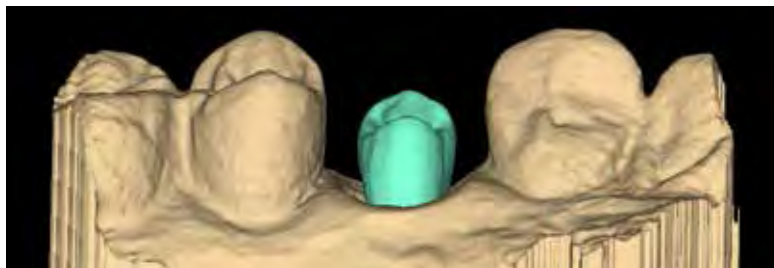
3   Deselect **Autogenesis**, and then click **Apply.**
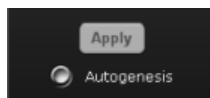
4 The new proposal generates. This tooth is very small initially, but we will manually increase the size using the following design steps.

5 Click **Incremental Change Tools.**

The goal is to do as much with these tools as possible before moving on to the Freeform Change Tools.

6 Use the arrows in the **Move** section to center the restoration from the occlusal view.

7 Next, use the arrows in the **Rotate** section to correct the angulation of the occlusal table if necessary.

8 Now use the arrows in the **Expand** section to reach for contact, adjust the height of the occlusal table, and align the cusp tips as needed.

9 Once the tooth has attained the best overall starting position, then click **Apply** next to the Expand arrows.
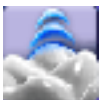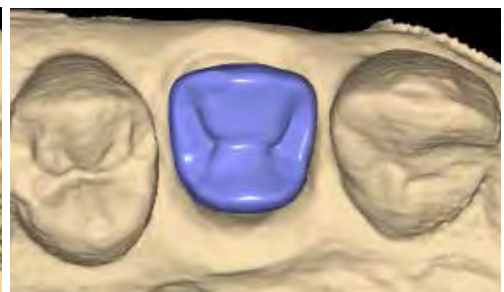
10 Click **Freeform Change Tools.**
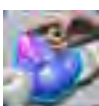
11 Use **Rubber Tooth** to re-contour the axial walls of your proposal. Examine your axial contours from a profile view, and ensure they are similar in shape to the adjacent teeth.

12 If needed, use the **Dropper** tool (2.0 horizontal, 0.04 Vertical) to add virtual wax to the cervical third. Once added, contour the virtual wax using the **Smooth Surface** tool (2.0 horizontal, 0.4 vertical).

13 Examine the occlusal anatomy, and shape as desired using the **Freeform Change Tools.**
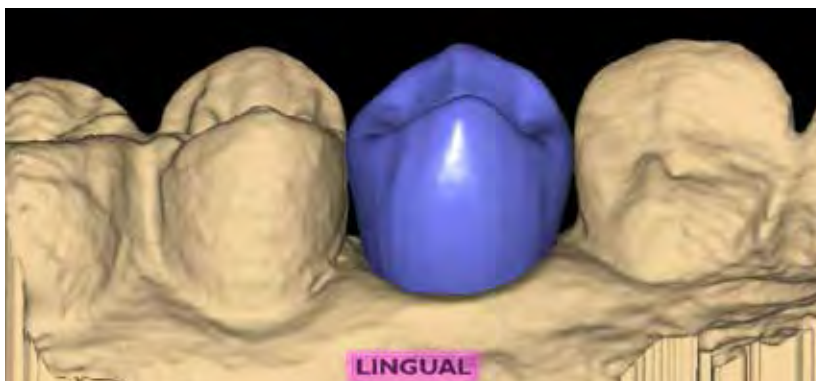
Large Preview Tooth Method

Margin Tab

Mark the margin on the abutment.
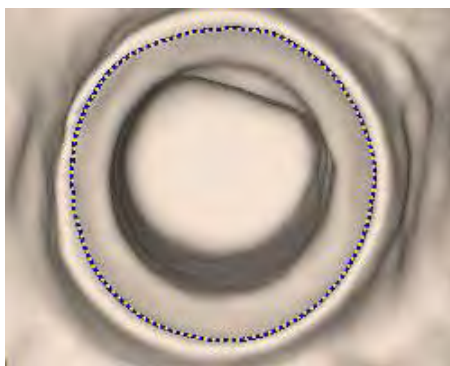
Design Tab

1   Click the **Design** tab.

2   Resize and reposition the preview tooth to match the adjacent teeth.
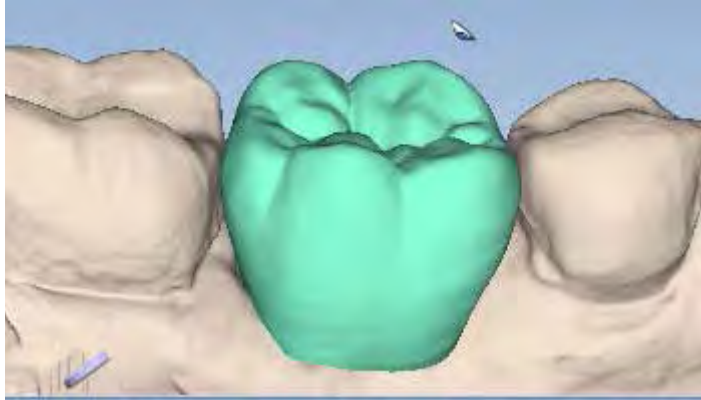
3   Evaluate the position of the preview tooth in relation to the margin. This can be done with Slice Plane or from the Gingival View if the library tooth can be seen from below.

The edges of the Library Tooth must be outside of the designated margin.
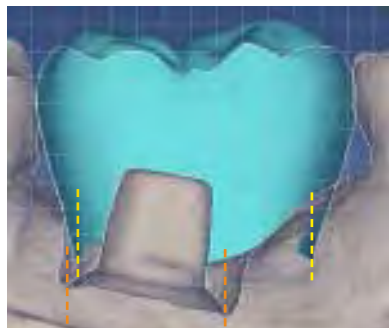
Poor - The implant's angle cause its margin (orange lines) to be outside of the Library Tooth's edges (yellow lines).
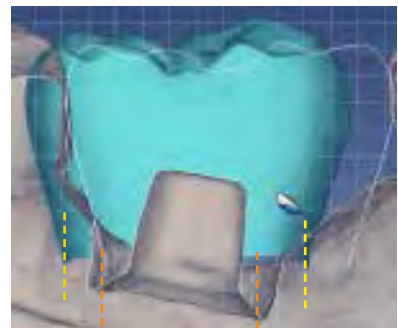
Good - Move the Library Tooth (yellow lines) to be outside of the implant margin (orange lines). It is acceptable for the Library Tooth to overlap with the adjacent tooth.

4   Deactivate **Slice Plane.**

5   Deselect **Autogenesis** and click **Apply.**
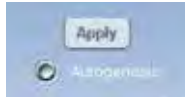
Your initial proposal should resemble the following.

6   Use **Incremental Change Tools** to **Move** the proposal towards the Mesial.
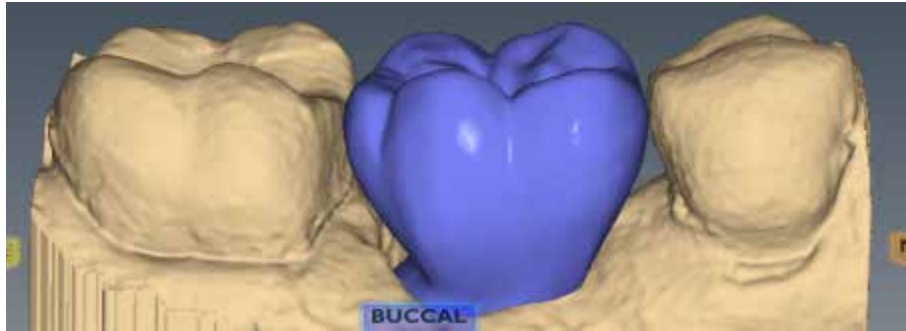
7   **Expand** if needed to adjust contacts.

8   Click **Hide Model.**

9   Click **Freeform Change Tools.**

10   Click **Smooth Surface.** The small diameter of the implant and the drastic movement to the Mesial can create some distortion. Smooth any twisted or distorted areas.

| Before | After |
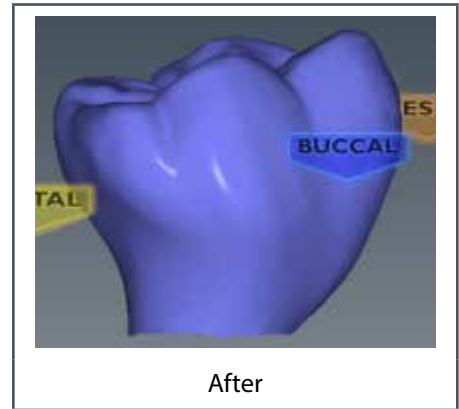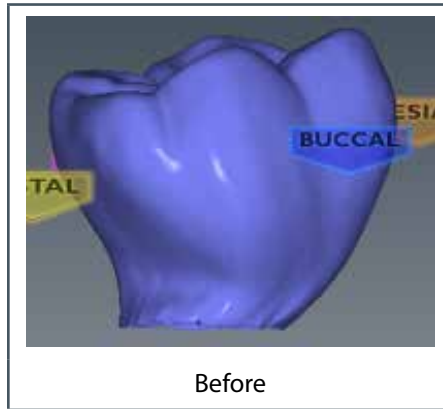
Note: If the twisting on the bottom of your restoration is too drastic to be corrected with Smooth Surface, try repositioning the preview tooth and regenerating the proposal or try a different method.

11   Click **Hide Model** to deactivate it.

12   Follow the normal design workflow to adjust the embrasures and contacts.

When designing the proposal, remember to take into consideration the healing status of the tissue surrounding the implant. Because tissue moves, it is usually advisable to design the proposal with an ideal emergence profile to avoid creating food traps when the tissue finishes healing. Manually adjust the restoration/tissue contact areas during seating.

Your proposal should resemble the following:
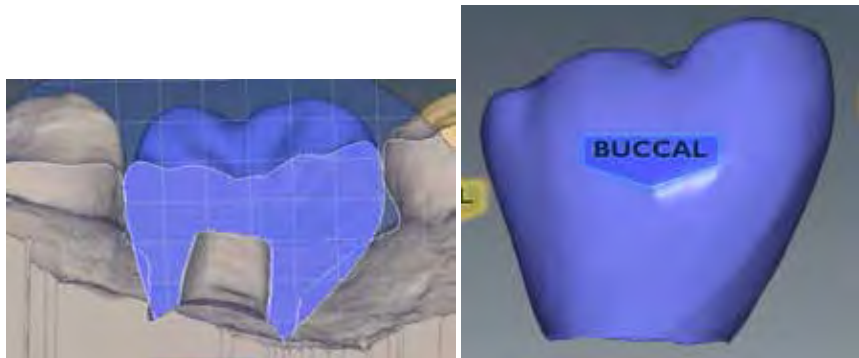
Extended Margin Method

You can mark the margin on the gingival tissue and then manually remove the excess after the restoration has been milled. This is recommended when there is a large gap between the implant and a neighboring tooth.

1   Mark the margin on the tissue where the natural tooth's emergence should begin.
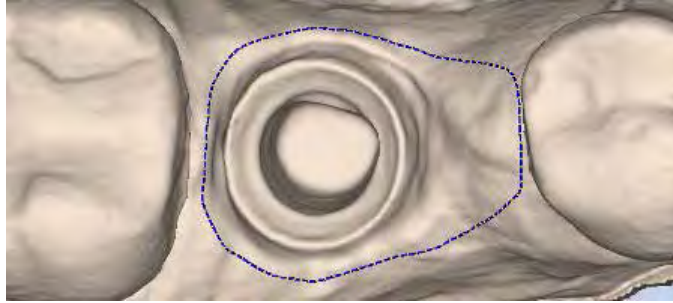
2   On the Tooth Libraries page, deselect **Autogenesis** and click **Apply.**
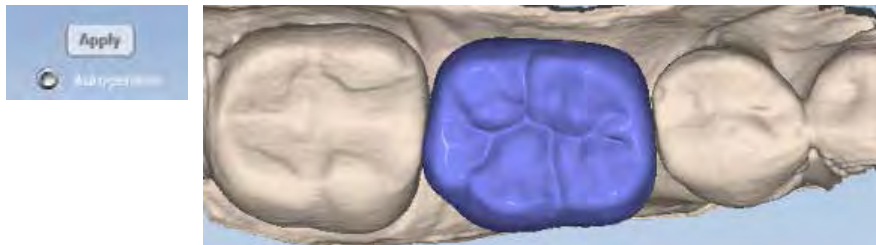
3   Follow the normal design workflow.

4   When the restoration is milled, there will be excess material where the margin was placed. This needs to be removed with a bur to provide the proper contours for he restoration.
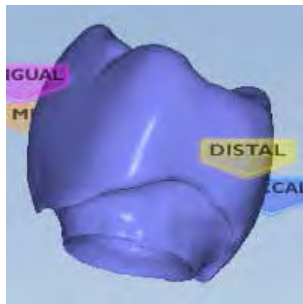
11 *Bridges*

Bridge cases are unique in that they are designed as individual teeth and milled as one unit.

This chapter assumes familiarity with multiple restoration cases and other intermediate to advanced topics. Refer to other chapters for more information.

Tooth Preparation for Bridges

Ensure the preparations for the abutment teeth are not angled in different directions. If one is pointed towards the lingual and one towards the buccal, there may be problems with path of insertion and overmilling. Cantilever and Maryland bridges are not supported.

Designating a Bridge

A bridge is made up of two or more restorations that are connected. On the Setup tab, select each tooth on the anatomical model that is part of the bridge. For each tooth, you must select the restoration type.

1   Select each tooth that is part of the bridge - the abutment(s) and the pontic(s).

2   Select the **Restoration Type** for each tooth. In the example below, Tooth 19 is a Pontic and the abutment teeth are Crowns.

3   Click **Link.** The cursor changes to a chain symbol.

4   Click the mesial and distal teeth of the bridge. After each end of the bridge is selected, the teeth turn purple.

The teeth are now designated as a bridge.

5   Select the first tooth in the bridge and designate the Library, Material, and Shade. The material and shade is duplicated on the other teeth in the bridge when you click on them.

6   Select the remaining teeth in the bridge and designate the Library. Library must be chosen for each restoration before you can continue to the Scan Tab.

> **Note:** If Library, Material and Shade are chosen before linking the bridge. The software will replace the Material and Shade of the remaining restorations with that of the highest tooth number after the link.

Multiple bridges can be created on the same arch. Repeat the steps above to create another bridge.

Unlinking a Bridge

If there is an error in how the bridge was linked, click Unlink and click on any of the teeth in the bridge.

Scanning Bridges

The scanning procedure for a bridge is the same as that for a multiple restorations case. Scan the prepped teeth, the edentulous area, and two unprepped neighbors or more unprepped neighbors to aid in design.

Note that scanning more teeth on anterior bridges will aid in the smile design.
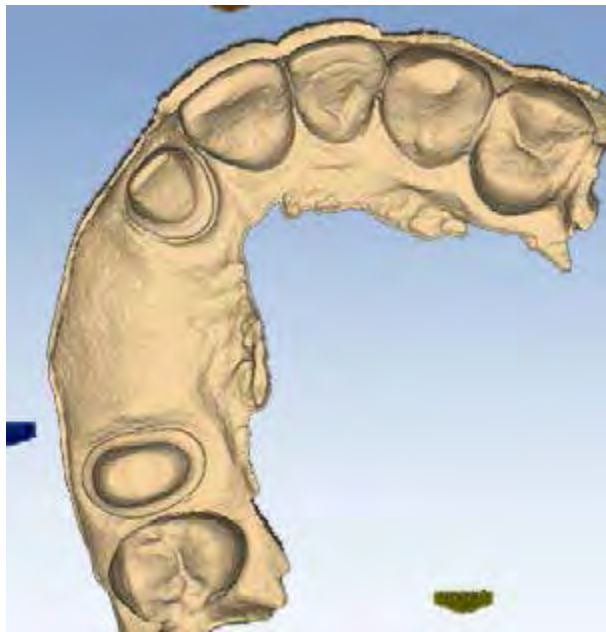
Bridge Orientation

Set the Orientation for each tooth tab. Good model alignment will aid Autogenesis with the design.

Drawing Pontic Margins

A margin is drawn for each tooth in the bridge.

1 Click the tooth number tab for each abutment and draw the margin on the selected tooth.

An edentulous space does not technically have a margin. The margin is drawn to aid the design process.

2 Click **Trace** and designate the position and extension of the base of the pontic on the gingival tissue to fit the appropriate contour.

> **Note:** Do not go too far down the curve of the gingival tissue or you may not be able to fit the bridge in the block.
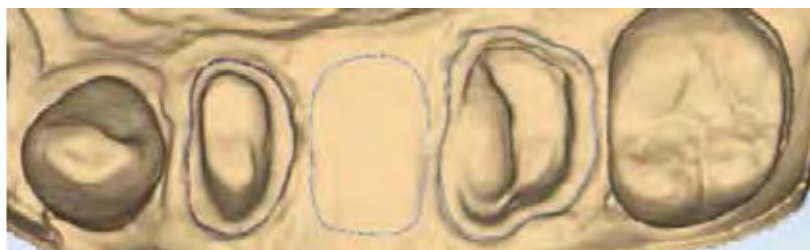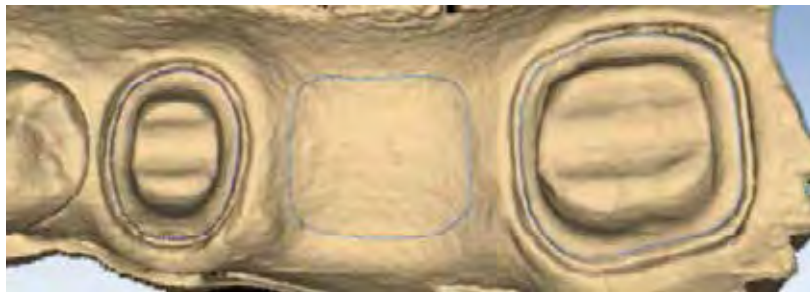
Designing the Bridge

With any multiples case, it is generally best to start the Autogenesis process on a tooth with an existing neighbor. In a bridge case, that means starting with the abutments.

1   Rotate to evaluate the position of the preview library tooth.

In this example, the preview tooth is high because the system is attempting to match the height of the higher mesial data. This will result in a distorted initial proposal. The size and position of the preview tooth is important when Autogenesis is deactivated.
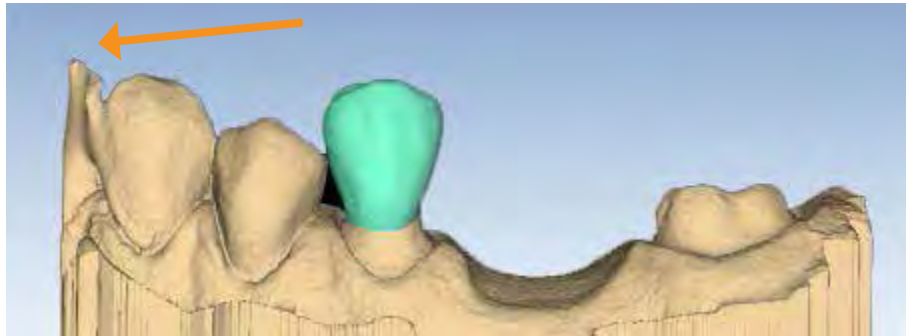
2   Resize **(Alt + arrows)** and move **(drag and drop)** as needed.
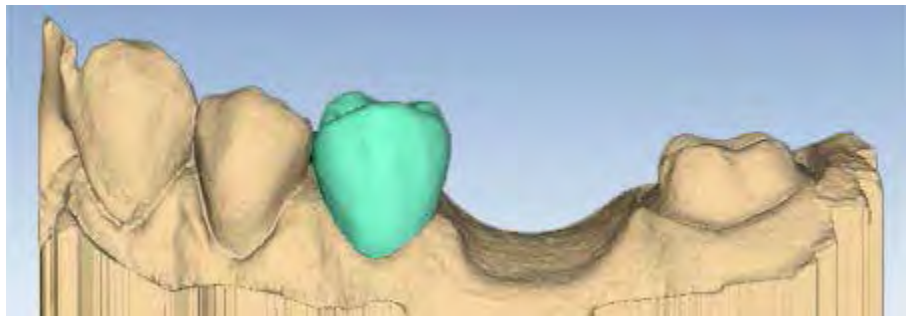
3   Click **Apply.**

4   Repeat these steps for the other abutment.

5   Repeat these steps for the pontic(s).
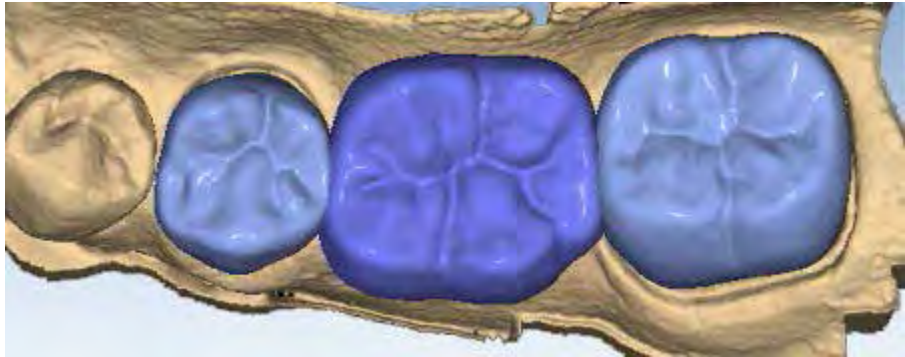
When you rotate the model, you will notice that the pontics have a solid base and are raised above the gumline (0.75 mm). The gingival aspect of the pontic follows the contours of the edentulous tissue and can be adjusted utilizing the design tools.
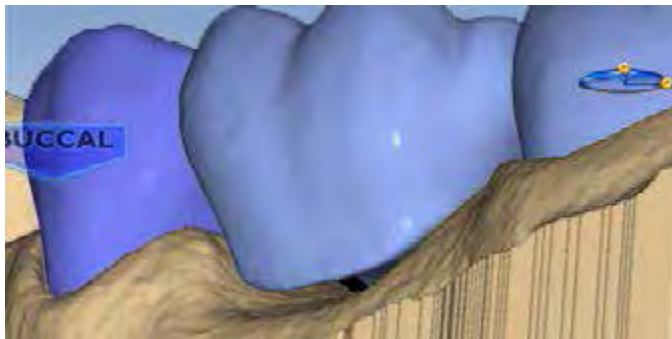
6   Follow the normal design workflow with interproximal contacts being the only difference.

7   Adjust the interproximal contacts that touch unprepped teeth to the same contact strength that you normally use.

The contacts of the bridge teeth will be fused together to form the bridge, so the actual contact strength is not a concen, but the contact should be heavy enough to ensure a proper connection.

8   When you are satisfied with your designs, click the **Mill** tab.

Evaluating the Connectors

It is important to evaluate the connections on the bridge and look for possible hangups.

The sprue will be on the mesial or distal side of the bridge.

1   Click **View Model** to hide the model.

2   Click **Sim.**

When the Simulation is run, the connections between the teeth are displayed.

3   Click **Slice Plane** twice.

When Slice Plane is activated on a bridge mill simulation, the system measures the slice width. If the slice is thinner than the material guidelines, the slice displays as red. It is important to slice the simulation through the thinnest part of the connectors (orange lines in the examples).
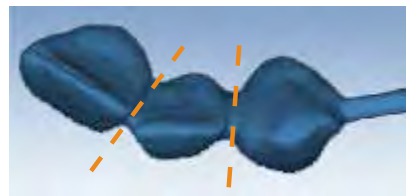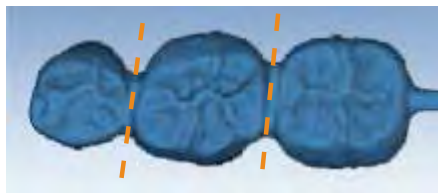
Posterior cases tend to have wider contacts with smaller embrasures and are unlikely to be thin. Anterior cases have smaller contacts and larger embrasures. Any thin area should be evaluated.

4   Move the Slice Plane to a connector. If the Slice Plane needs to be rotated to slice through the thinnest part, hold down the **Ctrl** key while moving the mouse to rotate.

5   Rotate the model to view the slice.

6   If the slice is red, adjust your embrasures and/or contacts and try the simulation again. Note that when the model is hidden, the Slice Plane icon displays the mm^2 area.
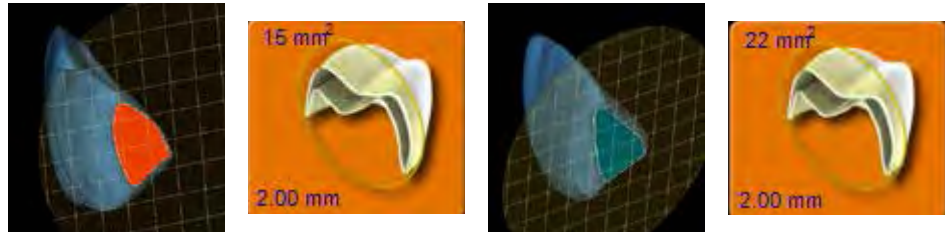
Minimum required thickness:

- Zirlux FC2 - 9 mm^2

- Telio CAD - 12 mm^2

- IPS e.max - 16 mm^2

7   Click **View Model** to activate it.

8   Click the **Gingival** View Control arrow to view the model from underneath.

9   Look for mill simulation issues. See "Mill Simulation" on page 127 for more information. Call Customer Support for help on your first few cases of possible milling issues on Bridges.

Spacer Tool Settings on Bridges

The default Spacer Tool settings are different on bridges to account for the larger Path of Insertion.

The normal maximum for the spacer is 0.20 mm. On bridge cases, the spacer defaults to 0.20 mm and can be increased to 0.30 mm.

A larger default margin ramp of 1 mm is used to aid in stability.

12 *Scanner Specifications*
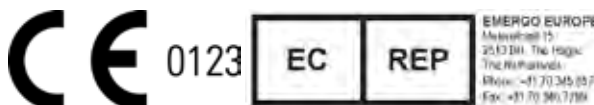
CE 0123 | EC | REP

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Molenstraat 15
2513 BH, The Hague
The Netherlands
Phone: +31 70 345 8570
Fax: +31 70 346 7299

Australian Sponsor
Emergo Australia
Level 20, Tower II
Darling Park
201 Sussex Street
Sydney NSW 2000

Model Number: PlanScan

P/N: 12370003

Electrical Ratings: 12Vdc, 12W

Storage conditions: -29°C to 38°C (-20°F to 100°F)

Operating conditions:
20 °C to 28 °C (67.5 °F to 82.5 °F) < 90%
non-condensing relative humidity
maximum altitude 6,562 ft (2,000 m)

Dimensions:
Scanner with tip - 1.9 x 2.1 x 10.9 inches (48 x 53 x 276 mm)
Scanner without tip - 1.9 x 2.1 x 7.4 inches (48 mm x 53 mm x 188 mm)
Scanner tip - 1.6 x 1.9 x 4.8 inches (40.5 x 49 x 123 mm)

Weight:
Scanner with tip - 19 oz (544 g)
Scanner base - 18 oz (516 g)
Scanner tip - 1 oz (28 g)

Cables

When connecting components, ensure you use only the cables provided with the system. The following cables were provided with the scanner.

Scanner Connecting Cable: IEEE 1394b Fire Wire Cable, Length 2M, shielded

FireWire to Thunderbolt Adaptor Cable: Shielded, Length 0.2M

Applicable Standards

Product Safety

ANSI/AAMI ES60601-1:2005
IEC 60601-1, 3rd Edition

EMC

IEC 60601-1-2
US FCC CFR 47, Part 15

Laser Product Safety

IEC 60825-1

Packaging and Environmental

ISTA Class 2A

Biocampatibility

ISO 10993

European Standards

EN 60601-1:2006
93/42/EEC Medical Device Directive
EN 60601-1:2006 Safety of Medical Electric Equipment
EN 60601-1-2 Electromagnetic Compatibility
EN 60825-1 Safety of Laser Products
EN ISO 14971:2012 Risk Management
EN ISO 13485 Quality Management Systems
EN ISO 10993: Biological Evaluation of Medical Devices

Canadian Standards

CAN/CSA C22.2 No. 60601-1:2008
SOR-98-282 Canada Medical Device Regulations
ICES-001 ISM Radio Frequency Generators

US Food and Drug Administration

US FDA CFR 21 Part 1040.10 Laser Products
US FDA Laser Notice 50
CFR 21, Part 820
FDA Class II Special Controls for Computer Assisted Design and Manufacturing of
Dental Restorations

International Standards

ISO 14971:2007
ISO 13485:2003

Approvals (All Systems)

North America	Product Safety Mark (NRTL) - UL C/US
International	CB Scheme Product Safety Test Certificate (UL)
	CB Scheme EMC Test Certificate (NEMKO)
	CE Mark (TUV)
Quality System Certifications	ISO 13485 Registered Firm
	CMDCAS (Canada)
	Japan GMP

Complies with FDA performance standards for laser products, except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This ISM device complies with Canadian ICES-001. (Cet appareil ISM est conforme à la norme NMB-001 du Canada.)

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Guidance and Manufacturer's Declaration -Electromagnetic Emissions

The PlanScan is intended for use in the electromagnetic environment specified below. The customer or the user of the PlanScan should assure that it is used in such an environment.

Emissions Test	Compliance	Electromagnetic Environment - guidance
RF emissions CISPR 11	Group 1	The PlanScan uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The PlanScan is suitable for use in all establishments other than domestic and those directly connected to the public low voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Not applicable	
Voltage fluctuations / flicker emissions IEC 61000-3-3	Not applicable	

Guidance and Manufacturer's Declaration - Electromagnetic Immunity

The PlanScan is intended for use in the electromagnetic environment specified below. The customer or the user of the PlanScan should ensure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	+/- 6 kV contact +/- 8 kV air	+/- 6 kV contact +/- 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment - guidance
Electrical fast transient / burst IEC 61000-4-4	+/- 2 kV for power supply lines +/- 1 kV for input/output	Not applicable	Mains power quality should be that of a typical commercial or hospital environment
Surge IEC 61000-4-5	+/- 1 kV differential mode +/- 2 kV common mode	Not applicable	Mains power quality should be that of a typical commercial or hospital environment
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% Ut (>95% dip in Ut) for 0,5 cycle 40% Ut (60% dip in Ut) for 5 cycles 70% Ut (30% dip in Ut) for 25 cycles <5% Ut (>95% dip in Ut) for 5 sec.	Not applicable	Mains power quality should be that of a typical commercial or hospital environment.
Power frequency (50/60 Hz) Magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Note: Ut is the a.c. mains voltage prior to application of the test level.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment - guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the PlanScan, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	

Recommended separation distance

$$d = 1.2\sqrt{P}$$

$$d = 1.2\sqrt{P} \quad \text{80 MHz to 800 MHz}$$
$$d = 2.3\sqrt{P} \quad \text{800 MHz to 2.5 GHz}$$

where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b] Interference may occur in the vicinity of equipment marked with the following symbol:

NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

a. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the PlanScan is used exceeds the applicable RF compliance level above, the PlanScan should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the PlanScan.

b. Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Recommended Separation Distances

The PlanScan is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the PlanScan can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the PlanScan as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz $d = 1.2\sqrt{P}$	**80 MHz to 800 MHz** $d = 1.2\sqrt{P}$	**800 MHz to 2.5 GHz** $d = 1.2\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

PlanScan Optical Specifications

Caution Using controls, making adjustments, or performing procedures in a manner other than is specified in this documentation may result in hazardous radiation exposure.

Laser Class[a]	Class 2
Output	4.95 mW
Wavelength	450 nm
Beam divergence	10 degrees

a. Laser product classified to standard IEC/EN 60825-1:2007-03 Ed. 2.0

The scanner's laser projection system utilizes a divergent beam powered by a non-accessible laser source with a maximum power output of 200 mW. The scanner incorporates design features that prevent exposure to any hazardous levels of laser radiation in normal operation modes and in any reasonable fault conditions.

Labels

Symbols

The following symbols are used on various labels on the system.

Symbol	Definition
EC REP	Authorized Representative in the European community
	Class 2 electrical product
	Date of Manufacture
	DC Current
	This product must NOT be disposed of with other waste. It is the user's responsibility to dispose of their waste electrical and electronic equipment by handing it over to an approved reprocessor, or by returning it to E4D Technologies for reprocessing. For more information about where you can send your waste equipment for recycling, please contact your local city office or E4D Technologies.
CE 0123	European conformity
	General mandatory action
	General warning
	Laser warning

Symbol	Definition
LOT	Lot number
	Mandatory Safety ISO 7010-M002
	Manufacturer
REF	Catalog number
SN	Serial number
	Standby IEC 60417-5010
	Type B Applied Part IEC 60417-5840

Product Identification Labels

Affixed to the scanner are product identification labels that contain identification and safety information. Be certain to read all product labeling.

Note: If any of the labels are missing or illegible, please contact Planmeca After Sales for replacement labels.

Note: The labels may have changed since this book was published.

450 nm, 4.95mW CW
IEC/EN 60825-1:2007

LASER RADIATION
DO NOT STARE INTO BEAM
CLASS 2 LASER PRODUCT

External Components and Connectors

When connecting external components to the E4D system, attach only components that have been tested for compliance with IEC 60601-1 or UL 60950.

Connectors for attaching external devices conduct low voltages. Avoid touching the connector pins.

Internal Fuse

FS2 - 1.5A/63V/FF/50A IR

UL Listing

UL Medical Equipment Listing

MEDICAL - GENERAL MEDICAL EQUIPMENT

AS TO ELECTRICAL SHOCK, FIRE AND MECHANICAL HAZARDS ONLY

IN ACCORDANCE WITH ANSI/AAMI ES60601-1 (2005)

CAN/CSA C22.2 No. 60601-1:2008

EN 60601-1 (2006)

IEC 60601-1-2

IEC 60825-1

30SD

13 PlanScan and PlanCAD Troubleshooting/Repair

If you have questions, please contact Customer Support at

Toll Free	800-537-6070
E-mail	customersupport@e4d.com
Fax	972-479-1106
Hours of Operation Monday - Thursday Friday	7 am – 7 pm CT 8 am – 5 pm CT
Web site	www.e4d.com
Mailing Address	D4D Technologies LLC dba E4D Technologies 650 International Pkwy Richardson, TX 75081

Symptom	Probable Cause	Corrective Action
No power	Power cable unplugged	Verify power cable is plugged into a live AC outlet.
	Outer power supply switch turned OFF	Set power supply rocker switch at rear of the unit to "ON" position.
	Inner power supply switch turned OFF	Ensure switch on power supply is turned ON. (Call Customer Support)
Login screen appears	Screensaver login turned ON	Go to properties, then screen saver and turn it OFF.

Symptom	Probable Cause	Corrective Action
Failing to send restoration		(See Job Server troubleshooting).
Fan making loud noises		Replace fan. (Call Customer Support)
	Out of balance	Call Customer Support.
DentaLogic™ application freezing	Low memory	Re-start application or re-start system.
Mouse not responding	Low batteries	Replace batteries.
	Loose mouse dongle	
Laser flickering	IOD Cable not grounded properly	Call Customer Support.
Skyball not responding	USB cable not plugged in	Plug USB in
	3D Connexion settings are incorrect	Open the 3D Connexion program and check the settings.

14 *PlanMill 40 Introduction*

Turn ON the Job Server

Press the **Power** button on the front of the Job Server to turn it ON. No monitor or mouse needed.

Turn OFF the Job Server

The Job Server can be left ON overnight, but it should be shut down and restarted every few days.

Press and hold the Power button on the front of the Job Server. Release after a few seconds. The power light will turn OFF.

Turn ON the PlanMill 40

Power Buttons

Press the small round button on the front of the mill to turn it ON.

1 Stop/Abort   **2** Power

Note: The power button on the back of the mill shuts off electrical power to the mill. This is generally left ON. The red button on the front of the mill will stop/abort the milling process.

The screen on the mill is a touch screen. No mouse is needed.

Display Screen

When the mill application loads, the following screen appears.

1   Close the lid and remove the interlock key if needed.

> **Note:** The interlock key is used by service technicians for diagnostic purposes and is located on the right side of the mill.

2   Touch **YES** and wait for the machine to finish initializing. The lid lights turn green when the mill is ready.

Lid Lights

The lid lights change color based on the status of the mill.

Lid Color	Description
Blue	Mill is initializing.
Green (solid)	Mill is idle or is milling. It can accept instructions (select restorations, cancel milling, replace tools, etc.)
Green (flashing)	Milling complete. The restoration has completed milling and the lid is open.
White	Lid is open.
Yellow	Warning is being displayed.
Red (solid)	The mill is in the "diagnostic" mode. Re-initialize the mill to return to idle.
Red (flashing)	The mill has faulted. Warning screen: Re-initialize to clear the fault or enter the diagnostic state to attempt to diagnose the problem.

Turn OFF the Mill

1 Touch **Maintenance** to see the Mill Options screen.
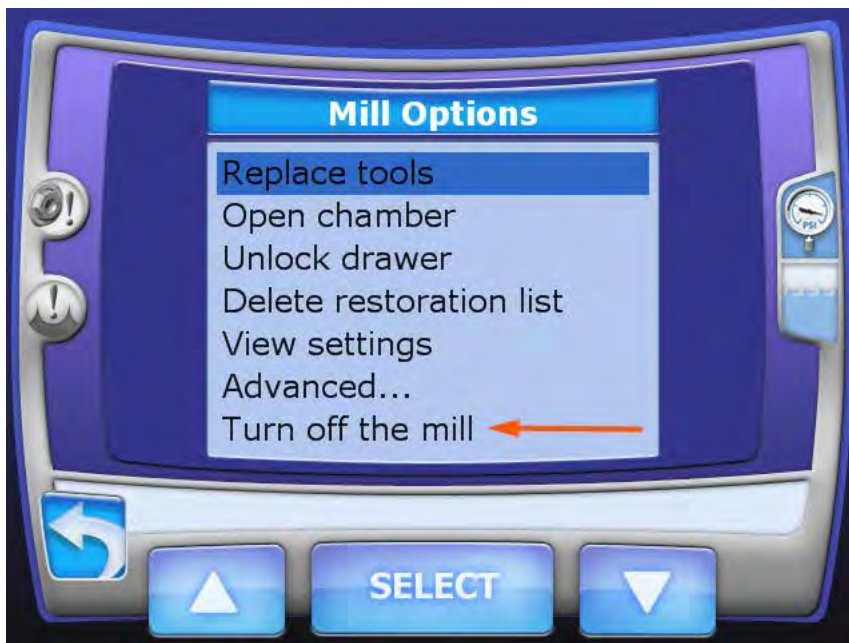
2 Touch **Turn OFF the mill.**

3 Touch **Select.**

A verification screen appears.

4   Touch **Yes** to turn OFF the mill. Touch **No** to leave it ON.

The desktop for the operating system appears.

5   Touch **Start.**

6   Select **Shut Down.**

Relocating the Mill

Warning: The mill weighs approximately 220 lb. (100 kg). Always follow these guidelines when relocating the machine.

Be certain to drain the mill's fluid reservoir before moving the unit.

The Mill is designed to operate on a level and stable surface in an environment free from excessive moisture or dust. The mill should be located away from the patient access area. When choosing a location for the mill, adhere to all clearance requirements stated in System Specifications.

1   Ensure no milling operations are in progress.

2   Open the front access panel and remove the fluid reservoir.

3   Empty the fluid reservoir according to your approved material disposal protocols.

4   Turn OFF the mill.

5   Disconnect all power and data connections.

6 Lift the mill onto a cart that is capable of supporting the weight of the mill and its accessories. You are advised to use a suitable cart rather than moving the mill by hand. Lifting and carrying should be kept to a minimum.

> **Note:** The mill weighs approximately 220 lbs (100 kg). Lifting the mill requires at least two people.

Those lifting the mill should:

- Stand close to the mill with their feet approximately shoulder width apart, and one foot slightly in front of the other for optimal balance.

- Squat down by bending at the knees, not at the waist, keeping their backs as vertical as possible.

- Firmly grasp the mill before beginning the lift.

> **Note:** Be certain to lift the mill by the underside metal framework, not by the plastic housing.

- Refrain from twisting their bodies and slowly begin lifting, using their legs, not their back, to lift.

- Keep the mill as close to the body as possible to minimize stress on the back.

- If turning is required, turn by shuffling their feet, not by twisting their body.

- If it is necessary to place the mill below the level of their waists, each person lifting should follow these procedures in reverse order, keeping their backs vertical and bending at the knees.

- Be careful to avoid obstacles.

System Information and Upgrades

Software and Hardware

System software and hardware upgrades are initiated through E4D Technologies only. No software or hardware should be added or deleted to/from the E4D systems without prior approval of E4D Technologies. Doing so may result in damage to the system and will void the product warranty.

Job Server Software Version

The version of software on the Job Server will not be accessible without keyboard and monitor. If there is a question on the version of software, please contact a Customer Support Representative.

Mill Software Version

1 To view the version of software being used on the mill, select Maintenance from the Home screen.

2 From the Mill Options screen, select **Support Console.**

3 Select **Configuration.**

4 Select **Versions.**

The Model Number and Serial Numbers are on this screen.

When placing a call for service or support, you may be asked to provide the serial number, model number, software version number, or similar identifying data. The serial number and model number are located on the Product Identification Label, affixed to the rear of each unit. See "Product Identification Labels" on page 180.

15 PlanMill 40 Safety

Warning: Failure to adhere to all safety warnings may result in personal injury, equipment damage, or data loss.

The mill weighs approximately 220 lb. (100 kg). When lifting or moving the mill, follow the guidelines in *"Relocating the Mill" on page 167*.

Always ensure the mill is on a surface capable of supporting its weight of approximately 220 lb. (100 kg).

Use caution when handling the mill's cutting tools.

Before milling a restoration, ensure the mill has adequate milling fluid. Adequate milling fluid is required to prevent overheating and possible damage to the restoration blank and cutting tools.

Do not open the mill's cover while a milling operation is in progress. Doing so will result in the loss of data and restoration block; the milling process will have to be repeated.

To prevent flooding the interior of the mill, do not refill the mill's fluid tank by adding fluid to the milling chamber. Instead, open the fluid tank drawer, remove the fluid tank, and add fluid to the fluid tank directly.

This equipment is intended to be grounded. Connect the products to earth grounded outlet only.

If a power cord (other than the one provided with the equipment) is used for connecting to the power source, ensure it meets all of the following requirements:

- Detachable power supply cord
- Type SJT
- 18 AWG
- 3 conductor
- Rated 10 A or better

- For products outside of the United States and Canada, the power cord must be marked "HAR" or with a suitable agency marking from the country of intended use. The attachment plug and appliance coupler must be marked with a suitable agency marking from the country of intended use.

Do not use the products for any purpose other than its intended and labeled use.

To prevent electrical shock, do not open any sealed or user restricted access panels or connectors.

A detachable non-locking type power cord has been provided with this equipment as the disconnect device. Do not block access to the power cord. In case of emergency, remove power from the device by unplugging the cord at either end.

Do not block any of the product's cooling vents. Doing so may result in overheating and damage to the products and will void the product warranty.

When placing components, adhere to all clearances stated in *"Minimum Clearance" on page 211*.

Do not make any unauthorized repairs or modifications to the system software or hardware. This includes installing unauthorized software on the computer system or altering or bypassing any safety switches or mechanisms.

Do not install or operate the products in an environment where an explosion hazard exists, e.g., high oxygen area.

Comply with all applicable regulations when disposing of waste materials from the products.

Do not attach any equipment or devices to the products unless their use has been specifically authorized by E4D Technologies or Planmeca.

The wireless components in the products may be interfered with by other equipment, even if the other equipment is fully compliant with CISPR (International Special Committee on Radio Interference) emission requirements.

When possible, electrical equipment should not be used when adjacent to other electrical equipment. If adjacent use is necessary, the equipment should be observed to verify normal operation in the configuration in which it will be used.

When connecting the components, use only the cables supplied with the products. Failure to do so may result in increased electromagnetic emissions or reduced immunity to external electromagnetic emissions.

Ensure your products are properly maintained through periodic maintenance.

If you suspect equipment malfunction or failure, discontinue using the products and contact E4D Technologies Technical Support immediately. Do not attempt to make any repairs on the products.

Read and comply with all safety, warning, and instructional labels on the products.

16 *Operating the Mill*

Pending Jobs

The Pending Jobs list is the default screen.

1 Scroll to find the desired restoration by touching the up and down arrows. When the restoration is highlighted, touch **Select.**

Note: Always wait until the lid lights turn green before making any selections on the touch screen.

2 The system opens the lid and prompts you to insert the block that matches the material selected in the Design software.

Inserting Blocks

Blocks can be inserted vertically or horizontally. The Insert Block screen specifies the block orientation. Notice the notches face right in the examples below. If the notch is pointing to the left, you will not be able to insert the block. Round blocks use the vertical orientation of the mandrel.

> **Note:** The mandrel is the metal piece of the restoration block that is inserted into the mill to hold the block steady during milling.

Horizontal Orientation

For the horizontal orientation, the wide side of the rectangular block faces up, with the mandrel notch points to the top right. This side will usually have the printed label. Note the position in the picture below.

Vertical Orientation

For the vertical orientation, the narrow side of the rectangular block faces up, with the mandrel notch points to the bottom right. The round blocks are inserted with vertical orientation.

1   Insert the Mandrel T-Handle into the cam and turn 180 degrees counter-clockwise to loosen the cam.

2   Insert the block in the correct position and lock the block in place by tightening the cam.

To view a video that demonstrates the block insertion procedure, touch the movie icon. Use this process in reverse for unloading the finished restoration.

Composite Block Defoaming Solution

A Composite Block Defoaming Solution is used with 3M's Paradigm MZ100 blocks. Due to the nature of the composite material when milled, it is necessary to use this solution every time you mill with the MZ100 block. Without the defoaming solution, the milling fluid may foam and overflow.

1 After inserting the MZ100 block into the milling chamber, shake the bottle of defoaming solution and position it over the chamber.

2 Press down once to release the solution directly into the milling chamber.

3 Close the chamber and begin the milling process as explained below.

Zirlux FC2 Scale Factor

See the manufacturer's Instructions for Use provided with the Zirlux FC2 blocks for processing instructions.

Zirconia shrinks in the sintering oven. There are numbers on the side of the box that the blocks come in. You must keep this box with the blocks. Do not mix blocks from different boxes. Each box can have a different amount of shrinking. The Mill asks for the Scale Factor before a Zirlux FC2 is milled. The system will increase the size of the restoration according to this number. This means you cannot test the fit of the restoration before sintering.

Note: It is necessary to clean the mill and change the water **before** milling Zirlux FC2. If the zirconia is contaminated with other materials, it will turn green when sintered. Cleaning after milling is recommended because the zirconia acts as a thickening agent with the water.

Starting Milling

Milling is an automated process that varies in length of time based on the restoration data.

1 After inserting the block, close the lid and wait for the lid lights to turn green.

The system checks the positioning of the block and begins generating the toolpath.

You may wait a few minutes for the toolpath to be generated and then see the milling time in the Time Remaining field.

> **Note:** See the Troubleshooting section for assistance if you experience a problem generating a tool path or if the mill times out.

After the milling process is complete, the lid automatically opens.

2 Remove the restoration and any debris and close the lid.

Parked Job

When a job is interrupted by an error message or a manual cancellation of the job, it is saved in Parked Job. Only the most recent job is available in Parked Job.

> **Note:** Jobs interrupted by a power failure are not parked.

When a job has been saved, an icon will appear in the corner to notify you.

1 To restart the interrupted job, touch **Parked Job...**

2 Touch **Select.**

3 Reinsert the partially milled block if it had been removed.

> **Note:** Do NOT insert a new block for a Parked Job. A new block will result in **broken tools.** To restart the job with a new block, use Pending Jobs.

4 Follow the on-screen instructions.

The milling restarts from where it was cancelled.

Finished Jobs

Previously finished jobs can be milled again if desired.

1   To see a list of Finished Jobs, scroll to the bottom of the Pending Jobs list.
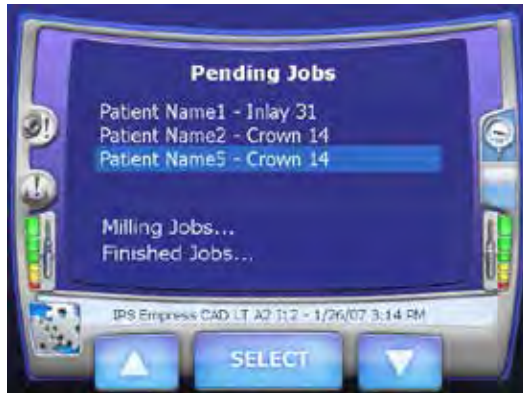
2   Touch **Finished Jobs...**

3   Touch **Select.**

The Finished Jobs list appears.

4   Touch the desired job to highlight it.

5   Touch **Select.**

You are prompted to insert the appropriate block. Milling continues as usual.

Deleting Jobs

Using the Delete Job List tool to delete individual jobs or all of the pending and finished jobs. This does not affect the patient or restoration lists in the Design software.

1   Touch the **Maintenance** button.

The Mill Options screen appears.

2   Touch **Delete job list.**

The job list is displayed with the text in yellow. This indicates that the mill is in the delete mode.

3   Stay on the Pending Jobs screen to delete a job from the pending list or touch Finished Jobs to switch to that job list.

4   Touch a job to highlight it.

5 Touch **Select.**

A warning message appears asking if you are sure you want to delete the job. Touch **Yes** to delete the job.

6 If you want to delete all of your pending and finished jobs, touch **All Pending, Parked, and Finished Jobs...**

7 Touch the **Return** button to return to the restoration list.

Automatic Tool Changer

The Mill's automated tool changer holds an array of grinding tools. The tool changer switches between grinding tools as the milling task demands.

The main screens display a graphic that indicates the age and type of tool in each spindle.

Minutes Used in Milling	Indicator Bars
0-39	3 Greens
40-79	2 Greens
80-119	1 Green
120-139	2 Yellows
140-159	1 Yellow
160+	1 Red

Tool Type	Tool Stripe Color
Ellipsoidal	Yellow
Tapered	White
Conical	Blue

Use "Replacing/Inserting Tools" on page 184 to fill the tool changer, exchange tool shapes, or to replace broken tools.

Broken Tools and Restoration Inspection

If a conical tool breaks halfway instead of at the shoulder, the broken tool may not be detected right away. If the broken tool continues to mill, it can cause damage or put black marks on the restoration.
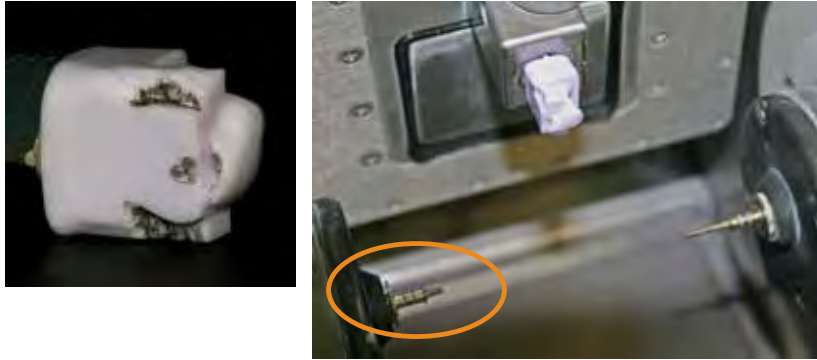
By default, the new Restoration Inspection feature is activated.

If a tool breaks:

- The lid lights turn blue and the lid pops open

- The operator assesses the restoration and closes the lid

Once the lid is closed, a new message displays.
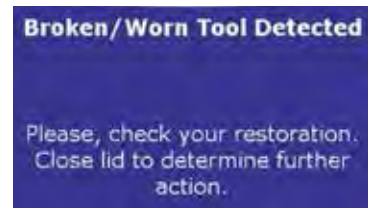
If the restoration has black marks or has come off of the mandrel, click No. The lid pops open. Remove the block. Select the job to restart milling. The system will prompt you to insert a new block at the beginning of the restarted milling process.

To continue milling with a new tool, click Yes.

To deactivate this feature, contact Customer Support.

Replacing/Inserting Tools

If a needed tool is not already in the tool changer, the following message will appear.

The reasons for replacing a tool include:

- Tool(s) needed for the restoration are not in the tool changer.
- Fill empty slots in tool changer.
- Tool in spindle is broken.
- Tool is too worn down to use.

1 On the Home screen, select **Maintenance.** The Mill Options menu appears.

2 Highlight **Replace tools** by either touching the screen or using the up/down arrows and touch **Select.**

The Replace tools screen appears. In the example below, there is a tool in each spindle, three extras in the tool changer, and one empty slot (green outline). There are two vacant places shown in the tool changer that do not have the green outline. The tools in the spindles will be placed there when they are being exchanged for another tool in the changer.

Empty

Tool
(colored stripes represent tool shape)

Old Tool

Worn Tool

Broken Tool
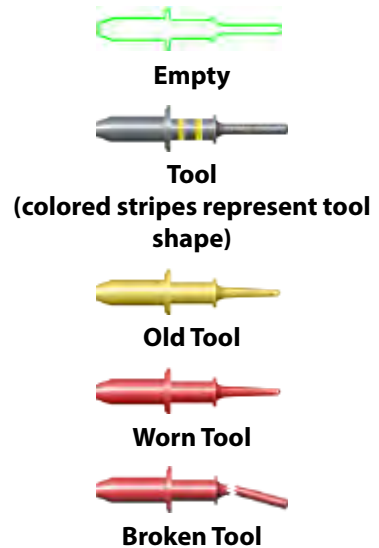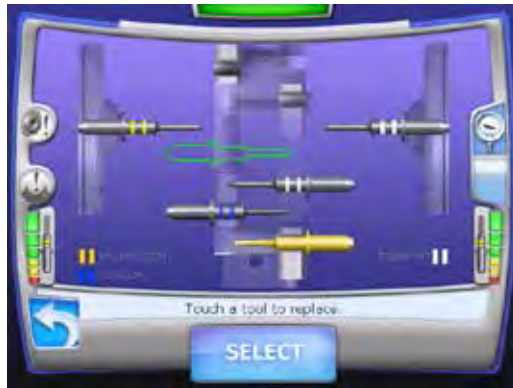
3 Touch the desired tool or empty slot.

The tool or empty slot changes color when selected. The bottom of the screen details the position, diameter, and elapsed time of the selected item. The tools are color coded to match the legend at the bottom of the screen.

4 Touch **Select.**
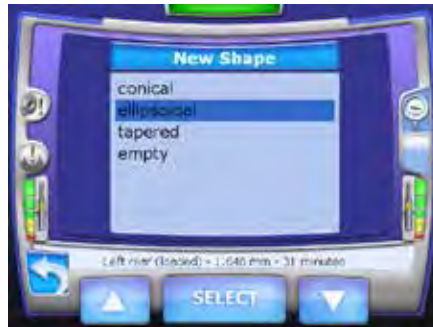
5 Highlight the shape of the new tool or touch empty to remove the tool without a replacement.

6 Touch **Select.**

7 Remove the old tool from the collet.

8 Place the new tool in the collet. Ensure it is pushed all the way in (fully seated).

9 Close the lid.

10 The Mill seats and clamps the tool, profiles the new tool, and returns to the Mill Options screen when finished.

If the wrong tool shape was inserted, a message will appear. Click **OK** to insert the correct tool shape.
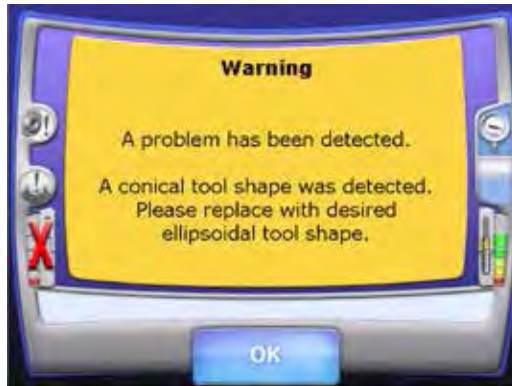
11 If you are filling the tool changer, repeat the steps above until there are no green outlines left.

12 Touch the **Return** button to return to the restoration list.

Override Mode

If the system has been put into Override Mode by Customer Support or a service technician, the following screen will be displayed upon startup.

The Override Warning icon appears on all screens. Touch the icon to view which sensors are being ignored.

When the Mill is in the Override Mode, normal operation can continue.

17 Mill Troubleshooting/Repair

If you have questions, please contact Customer Support at

Toll Free	800-537-6070
E-mail	customersupport@e4d.com
Fax	972-479-1106
Hours of Operation Monday - Thursday Friday	7 am – 7 pm CT 8 am – 5 pm CT
Web site	www.e4d.com
Mailing Address	D4D Technologies LLC dba E4D Technologies 650 International Pkwy Richardson, TX 75081

Mill

Symptom	Probable Cause	Corrective Action
Mill does not turn ON	Power cable unplugged	Verify power cable is plugged into a live AC outlet.
	Power supply switch turned OFF	Set power supply rocker switch at rear of mill to ON position.
	Faulty ON/OFF switch	Call Customer Support.
Block orientation on mill incorrect.	Dirty Block Orientation Sensor	Using a small/long object, push very gently on the sensor switch two or three times.
Pump making fast thumping noise.	Dirty tank	Clean tank. May also have to clean the collets.

Symptom	Probable Cause	Corrective Action
Air failure message (icon turns red)	Loss of air pressure	Ensure there is power to the office compressor.
	Air line loose	Secure air line from compressor to mill.
Fluid Level Low Message	Low water supply	Fill tank with water.
	Faulty sensors	Clean or replace sensors (Call Customer Support)
Tool stuck in collet	Collet rusty or caked with ceramics	Remove tools manually. Done in the maintenance/command screen on mill. (Call Customer Support for assistance).
	Tool jammed due to air pressure	Verify the supply air pressure 50 psig. Verify the pressure multiplier is maxed out. i.e. the adjustment knob is turned fully clockwise this doubles the pressure to 100 psig.
Not generating tool path	Incomplete information from the Job Server	Restart Job Server and Mill.
Drawer won't close	Pump assembly is lowered because drawer was not closed properly. If the drawer is closed and reopened before it can lock or if it is left open when the mill is shut down, the pump assembly is lowered and in the way of the drawer path.	Press Maintenance. On the Mill Options screen, press Unlock Drawer. The pump assembly rises and allows the drawer to close. If the Maintenance button is not showing, press the Stop button until the current process is stopped.
Milling is not completing on the facial surface of an anterior tooth	Restoration is longer than normal	On the design software, change the block selection to Multi Block, but be sure to select the same block size. You can then insert a standard Empress LT or HT block of the same size. The Mill makes multiple passes on Multi blocks while other materials use a single pass.

Job Server

| Symptom	Probable Cause	Corrective Action
Job Server does not respond	No power to Job Server	Make sure power cable is plugged into a live AC outlet
	Job Server process not running	Re-start Job Server
	Job Server turned OFF	Ensure Job Server is turned ON

18 *Preventive Maintenance/Cleaning*

Routine Mill Maintenance

Cleaning Cycle: High volume offices should clean daily. Most offices will need to clean weekly.

> **Note:** The mill must be cleaned more often when e.max or zirconia blocks are used.

Cleaning the chamber and replacing milling fluid are required to ensure proper operation of the mill.

Warning: Operating the Mill with insufficient milling fluid will damage the mill, void your warranty, and destroy the restoration that is being milled. Personal injury from the Mill overheating may result from inadequate milling fluid.
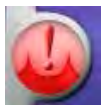
Clean Fluid Tank:

The Clean Fluid Tank icon turns red when the tank is scheduled to be cleaned. Touch the icon at any time to see how many milling hours are estimated before the tank needs to be cleaned.

1   Touch and hold the **Clean Fluid Tank** icon.

2   A message appears and shows the number of hours remaining before a scheduled cleaning is needed. Touch **Yes** to continue.

3   Follow the on-screen instructions for opening the drawer and removing the tank.

4   Remove the drain plug and tip the tank at an angle. Empty the liquid through the drain hole.

5   Rinse the tank and the strainer basket to remove any ceramic residue.

6   Insert the Nozzle Cleaning Brush into the small holes of the spindle cap.

7 Add one gallon of water (3.5 liters) and six ounces of fresh milling coolant to the tank.

> **Note:** Milling coolant must be used or the warranty will be void.

8 Remove and clean the strainer when prompted by the on-screen instructions.

The tank, floats, and strainer should be cleaned once a week to prevent mold growth or build-up of ceramic material and for optimal circulation. High volume offices need to clean the strainer and fluid tank more frequently.

For Your Information

Dirty tank floats and strainer will affect the fluid pressure of the mill and not allow the Mill to work properly.

9 Reinstall the strainer and click **Next.**

10 Replace the tank in the drawer when prompted by the on-screen instructions.

11 Close drawer carefully, with audible click. The Mill automatically locks the drawer.

Refill milling fluids:

The water level icon shows when the water level is too low to continue milling.

1 In the Control Panel Home screen, touch **Maintenance.**

2 Select **Unlock drawer** on the Mill Options menu.

3 Follow the on-screen instructions for opening the drawer.

4 Remove the tank.

5   Add one liter (or quart) of water. If additional fluid is required, then perform a tank cleaning and replenish the tank with fresh coolant and water.

6   Replace the tank in the drawer.

7   Close drawer carefully, with audible click. The Mill automatically locks the drawer.

Clean the mill chamber:

1   Select **Open chamber** on the Mill Options menu.

The lid opens.

2   Wipe down the lid and the chamber.

Zirlux FC2 Mill Maintenance

It is necessary to clean the mill and change the water **before** milling Zirlux FC2. If the zirconia is contaminated with other materials, it will turn green when sintered. Cleaning after milling is recommended because the zirconia acts as a thickening agent with the water.
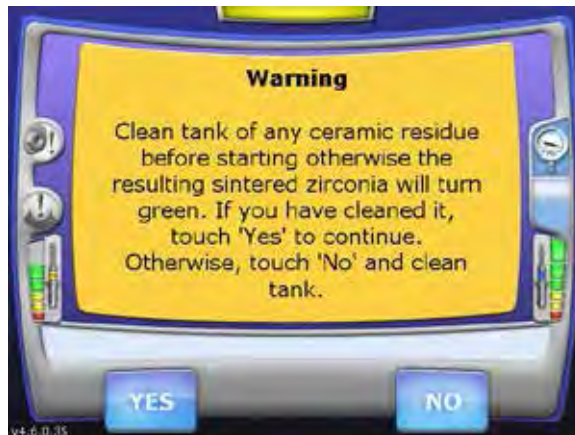
Spindle Cap and Collet Cleaning

Cleaning Cycle: As Needed

Over time, residue from the milling process may build up in the spindle caps and/ or on the collet. This inhibits coolant delivery and/or reduces the spindle's tool holding capability. Clean the collets and spindle caps when the icon turns red or the tools "walk" (do not stay flush with the spindle) during a restoration. Replace the fluid regularly to reduce residue buildup.

The Collet Cleaning icon turns red when the collets and spindle caps are scheduled to be cleaned. Touch the icon at any time to see how many milling hours are estimated before the caps need to be cleaned.

There are two spindle cap types available on the Mill. Follow the directions for the spindle caps in your machine.

Spindle Cap A - four visible screws
See "Spindle Cap A" on page 196

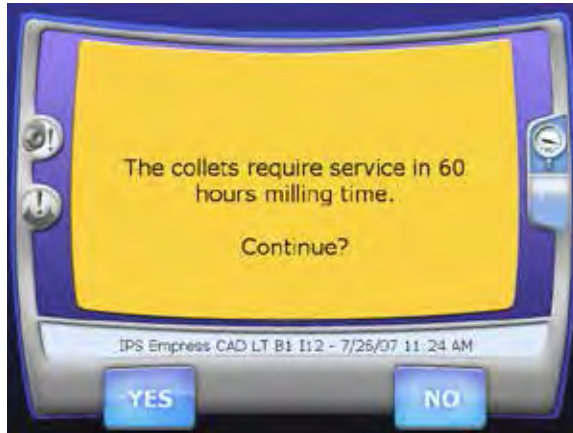Spindle Cap B - no visible screws
See "Spindle Cap B" on page 202

Spindle Cap A

1 Touch and hold the **Collet Cleaning** icon.

A message appears and shows the number of hours remaining before a scheduled cleaning is needed.

2 Touch **Yes** to continue.

The tools are automatically placed in the tool changer and the bellows are moved out of the way. The lid pops open when ready.

3 Use the hex wrench side of the collet tool to remove the (4) 3 mm screws from the spindle cap and remove the spindle cap and gasket. Ensure the gasket has been removed along with the spindle cap. Sometimes it sticks to the spindle housing.

Collet Tool

Spindle Cap and Gasket

4 Remove the collet using the other side of the collet tool. If the spindle is turning instead of the collet, use the 12 mm side of the silver collet wrench to hold the spindle in place while you loosen the collet.

5   Rinse the collet and use the small silver wire brush to clean the inside, running it through a couple of times.

6   Clean the outside of the collet as well. Any debris on the collet will cause the tool to not seat properly.

7   In the spindle (collet shaft), you are likely to see 3 lines of debris that need to be cleaned. These are from the slits in the collet. If they are not cleaned, the collet will not seat properly and will lead to "walking tools".

Note: The lines are not necessarily going to be positioned as seen in the example below. There will be three equidistant lines. The top one cannot be seen from the angle shown.

8   Use the larger bronze wire brush in the collet shaft. Be sure to use a straight in-and-out motion and do NOT use a circular motion.

Note: The air must be blowing during this step.

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9   Use a dental mirror to inspect the spindle or rotate it using the wrench to ensure all the debris has been removed.

10   Use a DRY paper towel to wipe the inside of the collet shaft.

Cleaning the collets and spindles is a very important process to keep your Mill running smoothly. Dirt will cause the tools to "walk" (not be seated properly) and can cause broken tools.

Five minutes of cleaning can mean the difference between the pictures below. Focus on cleaning the tapered surface inside the shaft and the front face. The tapered surface is critical.

Clean the outside of the collets as well as the inside. Dirt on the outside (as shown on right) can also cause the tools to "walk" if the collet cannot clamp properly.

11 Insert the collet into the spindle.

12 Use the wrench to hold the spindle housing in place and use the collet tool to tighten the collet. Be sure to **use your fingertips** to turn the tool to avoid using too much torque.

13 Insert the Nozzle Cleaning Brush in the small holes on the spindle cap at an angle. This will push any ceramic buildup out of the hole.

14 Clean the cap and the gasket with water.

15 Replace the spindle cap with the gasket.

16 Align the spindle cap and gasket using two of the screws. This ensures the gasket does not slip out of position while the pieces are being screwed into place.

Tighten the screws with the hex wrench side of the collet tool. **Use your fingertips** to turn the tool to avoid using too much torque.

17 Close lid when finished.

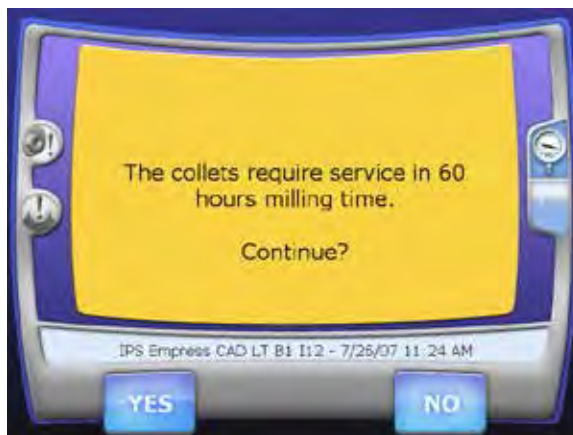The tools remain in the tool changer until the next restoration is selected to mill.

To skip the instructions for the other type of spindle cap, proceed to the next chapter.

Spindle Cap B

1 Touch and hold the **Collet Cleaning** icon.

A message appears and shows the number of hours remaining before a scheduled cleaning is needed.

The collets require service in 60 hours milling time.

Continue?

IPS Empress CAD LT B1 I12 - 7/26/07 11:24 AM

YES   NO

2 Touch **Yes** to continue.

The tools are automatically placed in the tool changer and the bellows are moved out of the way. The lid pops open when ready.

3 Use the Spindle Cap Tool to turn the spindle cap counter clockwise until the point of the spindle is pointing approximately to the 1:00 position. Remove the spindle cap.

Spindle Cap

Spindle Cap Tool in locked position - point of the spindle cap pointing down

Note: The spindle cap can be removed by hand, but it is often easier with the tool, especially when the spindle cap is wet.

4   Remove the collet using the shorter side of the collet tool. If the spindle is turning instead of the collet, use the curved collet wrench to hold the spindle in place while you loosen the collet.

Curved Collet Wrench

Collet Tool

Curved Collet Wrench - the curve of the collet wrench enables you to reach the grooves on the spindle

Use the wrench to hold the spindle in place while the collet tool turns the collet.

5 Rinse the collet and use the small silver wire brush to clean the inside, running it through a couple of times.
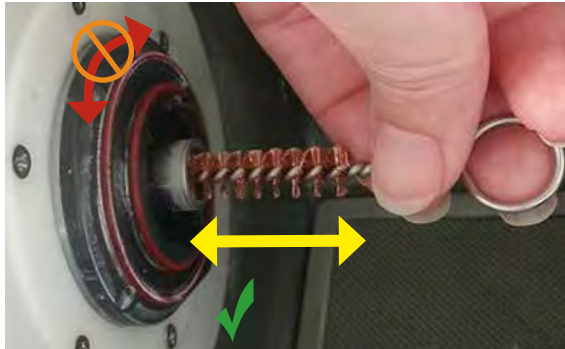

6 Clean the outside of the collet as well. Any debris on the collet will cause the tool to not seat properly.

7 In the spindle (collet shaft), you are likely to see 3 lines of debris that need to be cleaned. These are from the slits in the collet. If they are not cleaned, the collet will not seat properly and will lead to "walking tools".

Note: The lines are not necessarily going to be positioned as seen in the example below. There will be three equidistant lines. The top one cannot be seen from the angle shown.

8 Use the larger bronze wire brush in the collet shaft. Be sure to use a straight in-and-out motion and do NOT use a circular motion.

Note: The air must be blowing during this step.

---

9 Use a dental mirror to inspect the spindle or rotate the spindle using the wrench to ensure all the debris has been removed.

10 Use a DRY paper towel to wipe the inside of the collet shaft.

Cleaning the collets and spindles is a very important process to keep your Mill running smoothly. Dirt will cause the tools to "walk" (not be seated properly) and can cause broken tools.

Five minutes of cleaning can mean the difference between the pictures below. Focus on cleaning the tapered surface inside the shaft and the front face. The tapered surface is critical.

Clean the outside of the collets as well as the inside. Dirt on the outside (as shown on right) can also cause the tools to "walk" if the collet cannot clamp properly.

11 Insert the collet into the spindle.

12 Use the wrench to hold the spindle housing in place and use the collet tool to tighten the collet. Be sure to **use your fingertips** to turn the tool to avoid using too much torque.

13 Insert the Nozzle Cleaning Brush in the small holes on the spindle cap at an angle. This will push any ceramic buildup out of the hole.

14 Clean the cap with water.

15 Wipe the red O-Rings with a damp paper towel to remove any residue.

16 Replace the spindle cap. Note the L or an R on the spindle caps to denote on which side of the mill it belongs.

Note the alignment grooves on the spindle cap and spindle housing and the pointed extension on the spindle cap. You will use these for proper alignment.

To attach the spindle cap, align the grooves so that the spindle cap extension is pointing upwards. Then turn the spindle cap clockwise until the extension points downward and the cap groove aligns with the housing groove.

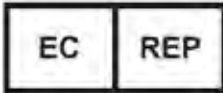**17** Close lid when finished.

The tools remain in the tool changer until the next restoration is selected to mill.

19 Mill System Specifications

CE 0123 | EC | REP |

EMERGO EUROPE
Molenstraat 15
2513 BH, The Hague
The Netherlands
Phone: +31 70 345 8570
Fax: +31 70 346 7299

Australian Sponsor
Emergo Australia
Level 20, Tower II
Darling Park
201 Sussex Street
Sydney NSW 2000

The components use standard electrical current and do not need to be attached to a water supply or drain.

Model Number: Mill	PlanMill 40
Electrical Ratings: E4D-DMC1	100-240 Vac, 300 W, 50-60 Hz
Mains Fuses:	6.3A/250Vac/Medium-Acting or T/1500A Breaking Capacity
Air Requirements:	50 - 130 psi, minimum 2 cfm, filtered, dry air
Data Connection Requirements:	Cat5 Ethernet cabling
Storage conditions	-20 °F to 100 °F (-29 °C to 38 °C)

Operating conditions for E4D equipment	Indoor use only
	41 °F to 104 °F (5 °C to 40 °C)
	Transient overvoltage category II per IEC 60364
	Maximum altitude 6,562 ft (2,000 m)
	Maximum 80% non-condensing relative humidity for temperatures up to 88 °F (31 °C) decreasing linearly to 50% relative humidity at 104 °F (40 °C)
	Pollution degree 2
Dimensions:	16 in. (399 mm) tall x 27 in. (676 mm) wide x 24 in. (608 mm) deep
Minimum Clearance	Sides: 2 in.; Rear: 1 in.; Top: 12 in.
Weight:	190 lb. (86 kg)

Applicable Standards

Electrical and Mechanical Safety	UL 61010-1:2004 w/Rev 2008
	CSA C22.2 No. 61010.1.04 w/Rev 2008
	IEC 61010-1:2001, 2nd Edition
	EN 61010-1
EMC	IEC/EN 61326
Packaging and Environmental	ISTA Class 2B
Additional Standards	ISO/EN 14971
	EN ISO 13485:2003/AC:2009
	ISO 13485: 2003
	CFR 21, Part 820
	SOR-98-282 Canada Medical Device Regulations
	FDA Class II Special Controls for Computer Assisted Design and Manufacturing of Dental Restorations
	European Directives • 93/42/EEC for Medical Devices • 2006/42/EC for Machinery • 1999/5/EC for Radio & Telecom

Approvals

North America	Product Safety Mark (NRTL) - UL C/US
International	CB Scheme Test Certificate (UL)
Quality System Certifications	ISO 13485 Registered Firm
	CMDCAS (Canada)
	Japan GMP

Labels

Symbols

The following symbols are used on various labels on the system.

Symbol	Definition
∿	Alternating Current IEC 60417-5032
EC REP	Authorized Representative in the European community
⚠	Caution: See instructions for use.
🏭	Date of Manufacture
♻	This product must NOT be disposed of with other waste. It is the user's responsibility to dispose of their waste electrical and electronic equipment by handing it over to an approved reprocessor, or by returning it to E4D Technologies for reprocessing. For more information about where you can send your waste equipment for recycling, please contact your local city office or E4D Technologies.
⊘	Do Not Reuse ISO 7000-1051
CE 0123	European conformity
🏭	Manufacturer
○	OFF Power IEC 60417-5008

Symbol	Definition
	ON Power IEC 60417-5007
	On/Off Power IEC 60417-5010
	Operating Instructions ISO 7000-1641
	Protective Earth IEC 60417-5019
	Type B Applied Part IEC 60417-5840
	Warning: Dangerous Voltage ISO 3864-B.3.6
	General Warning ISO 7000-W001

Product Identification Labels

Affixed to the Mill are product identification labels that contain identification and safety information. Be certain to read all product labeling. The following figures show each safety and warning label and describe where on the apparatus each can be found.
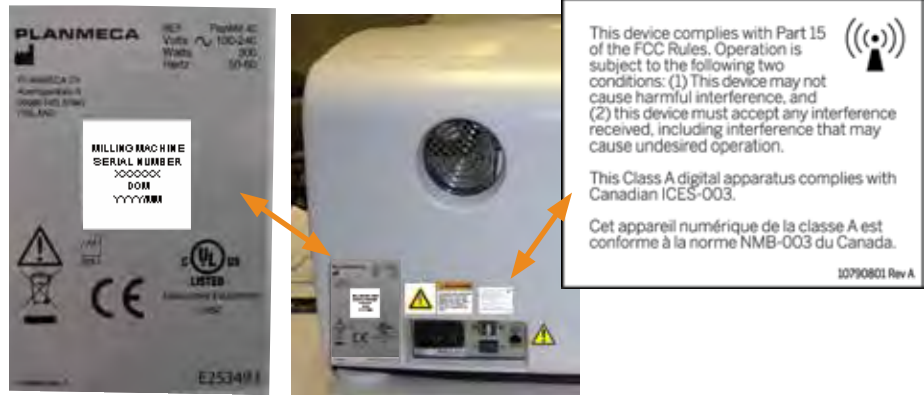
> **Note:** If any of the labels are missing or illegible, please contact E4D Technologies Customer Support for replacement labels.

> **Note:** Label examples are not shown actual size. The labels may have changed since this book was published.

Attention Labels

Attention labels are located in numerous places on the E4D components. These labels direct you to specific safety entries in this user manual. Adhere to all such safety warnings at all times.

External Components and Connectors

When connecting external components to the E4D system, attach only components that have been tested for compliance with IEC 60601-1 or UL 60950.

Connectors for attaching external devices conduct low voltages. Avoid touching the connector pins.

Protected Earth Ground Label

The Protected Earth Ground label is attached to the Mill e-box as shown.

Fuse Replacement

The E4D fuses are not user-replaceable. For fuse replacement, contact customer service. A service technician will replace fuses only with fuses having the specified voltage and current ratings.

WARNING

For continued protection against risk of fire, replace only with 6.3A/250Vac/Medium-Acting or T/1500A(200A min) Breaking Capacity

10791502D
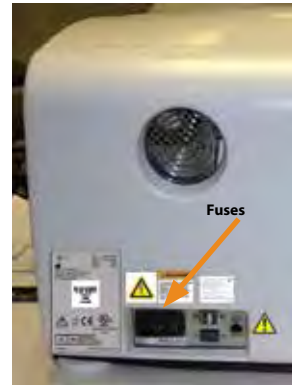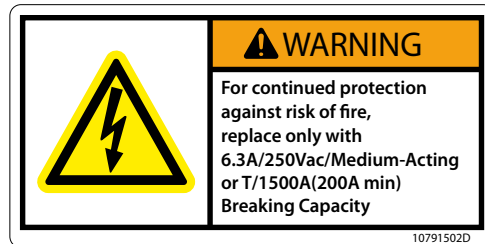
UL Listing:

UL Laboratory Equipment Listing

IN ACCORDANCE WITH UL 61010-1

30SC

20 *Importing and Exporting*

Note: The screenshots in this chapter are not created by E4D Technologies and may have changed since this manual was published. Please see the Romexis User Manual or www.planmecausasupport.com for more information on Romexis.

There are several methods for sharing digital information using Romexis.

- **CAD/CAM** cases can be transferred between other PlanScan or E4D systems. See "Importing a CAD/CAM Case" on page 219 and "Exporting a CAD/CAM Case" on page 219.

- STL files of CAD/CAM data can be imported and exported as **3D Models** to and from an external source. See "3D Model Import" on page 220 and "3D Model Export" on page 221.

- View images on an iOS device with **iRomexis** installed. See "Send to iRomexis" on page 226.

- Securly send and receive cases over the internet using **Planmeca Romexis Cloud** services or send to a lab through **DDX**. See "Sending CAD/CAM Cases via Cloud Export" on page 223 and "DDX Export" on page 226.

Import & Export Options within Romexis

	Intraoral Scans	Margins	Designs	ICE View	2D Images	3D Images	Documents
Import Options			Available Features for Import & Export				
CAD/CAM case	✓	✓	✓	✓			
3D Model - STL files	✓	w/Retact					
Planmeca Cloud services	✓				✓	✓	✓
Export Options							
CAD/CAM case	✓	✓	✓	✓			
3D Model - STL files	✓	w/Retact					
Planmeca Cloud services	✓				✓	✓	✓
DDX	✓	w/contact					
iRomexis	View Only				View Only	View Only	View Only

Importing a CAD/CAM Case

You can import a case from another PlanScan or E4D system into Romexis.

1   In Romexis, click **File - Import - Import CAD/CAM Case.**

2   A new screen appears. Click **Browse** to find the file with the time and date stamp as the folder name, ex. **[3-25-2014 10:37:42 AM].**

- If you have exported the files from another Planmeca system, a .zip file is created with the restoration number(s) as the name. Extract the files and open the folder to find the time and date stamped folder.

- E4D patient files are stored under the customer name (or whatever naming convention that was used) in the E4D system at c:\d4d\DesignCenter\patients\ PatientName\restorations\

3   Select how you want to import it:

- Import to current patient (if in a patient file)

- Create new patient (available when there are no patient files currently open)

- Select an existing patient (available when no patient files are currently open)

    Note: The selected CAD/CAM case will be imported into the Patient's Case Files list within the CAD/CAM Module.

Exporting a CAD/CAM Case

1   To export a file to share with another Planmeca system, click **File - Export - Export CAD/CAM Case.**

2   Select the destination folder and enter a file name. Click **Save**.

Importing 3D Models

3D Model Import

To import models into the CAD/CAM Module click **3D model import.**
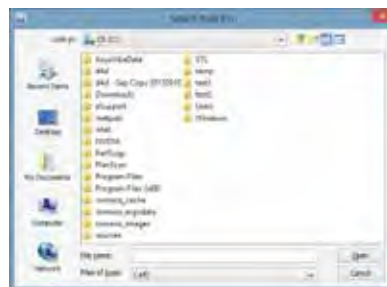
The following window opens.

You may import STL models from an external source, additional licensing may be required.

To import models from an external source:

1   Click **Browse.**

2   Browse to the folder from where you want to import the models.

3   Select the STL file and click **Open.**

Note: The imported case will appear in the Patient's Case Files list. You will only import the Prep & Opposing STL models. Bite alignment is from the external source.

Exporting 3D Models

3D Model Export

To export 3D models in STL format click the case in the Patient's Case Files list then **3D model export.**

1   Navigate to the desired destination folder. It is recommended to create a new folder on the desktop to easily find the files later.

2   Click **Save**

> **Note:** For equigingival or subgingival margins, ensure you have used the Retract margin tool to define your margin. The drawn margin is not saved and the STL recipient will not be able to use ICE View to find the margin. See "Retract" in Chapter 7.

Planmeca Romexis Cloud Export

Sending and Receiving Cases Via Planmeca Romexis Cloud

Planmeca Romexis Cloud is a subscription based image transfer service integrated into Planmeca Romexis. You can easily and securely share images and expertise securely with all partners who use Planmeca Romexis or the free Planmeca Romexis Viewer.

Cloud Service Descriptions

Planmeca Romexis Cloud Subscriber

Customers who have Planmeca Romexis and have the need to send/receive images and documents (referrals, reports etc) to/from others.

• Must run Romexis 3.1.0.R or newer

• Must create Planmeca Online account (free)

• Must subscribe to Planmeca Romexis Cloud (monthly fee)

Planmeca Online Account Holder

For customers who have Planmeca Romexis but only need to receive images and documents.

- Must run Romexis 3.1.0.R or newer

- Must create Planmeca Online account (free)

Casual Users

Users who do not have Planmeca Romexis but occasionally want to receive cases from Planmeca Romexis Cloud subscribers.

- Want to receive cases over the internet instead of receiving Planmeca DVDs.

- Must have e-mail address and internet access to receive download links for Planmeca Romexis Viewer + image packages.

> **Note:** Planmeca Romexis Cloud is not an image storage or archival service. Sending cases requires an active Cloud subscription.

Planmeca Cloud Features by account type	Casual user	Planmeca Online account holder	Planmeca Romexis Cloud subscriber
Internet access and e-mail address required	X	X	X
Download Planmeca Viewer + image packages from e-mail links	X	X	X
Replace DVDs with online transfers	X	X	X
Secure transfer and storage of patient data in the Cloud	X	X	X
Automatic notifications of new cases by e-mail.	X	X	X
Free Planmeca Online account		X	X
Planmeca Romexis 3.1.0.R or newer		X	X
Download cases directly in Planmeca Romexis		X	X
Manage received cases in Planmeca Romexis		X	X
Subscription to Planmeca Romexis Cloud (monthly fee, credit card required)			X
Send cases (images + documents) to other users directly in Planmeca Romexis			X
Manage sent cases in Planmeca Romexis			X

Sending CAD/CAM Cases via Cloud Export

See "DDX Configuration" on page 230 before continuing.

1   Select the CAD/CAM case in the Patient's Case Files list in the CAD/CAM Module.

2   Click the **Cloud Export** button.

3   Enter recipient's e-mail address in the **Send to** field or click the **Select Contact** button to select from past recipients.

4   To add any attachments click the **Add** button in the **Attachments** field.

> **Note:** Add the attachments first to the 2D Module's **Attachments** tab see section "Attachments" in Planmeca Romexis User's manual for more information.

5   In the **Case Description** enter the information that the recipient can see before downloading the case.

The Package size estimate field shows the amount of data that will be sent and counted towards your monthly subscription quota.

6   When finished click the **Send** button.

The case will be transferred to the cloud for the recipient to download. An e-mail is automatically generated and sent to the recipient notifying that there is a new case available for download. If the recipient is using Planmeca Romexis and has their configuration set, the new cases automatically appears in the Cloud Management tab under the Patients module.

The case is sent in the background so you can continue working in Romexis. Check the status of the transfer in the **Cloud Management** tab under the **Patients** module.

Additional settings and information

Send to recipient as E-mail download link

Enable this option if the recipient does not have Planmeca Romexis installed but wishes to view the case in Planmeca Romexis Viewer installed on a computer.

Include Romexis Viewer

With this option selected the recipient can download a copy of the Planmeca Romexis Viewer. This option is closest to creating and sending a Planmeca Romexis Viewer DVD.

Downloading cases from the Planmeca Cloud server

1 Browse to the **Cloud Management** tab under **Patients** module.

2 In the **Active Cases** list select the case you want to view and click **Download.**

You can monitor the download progress in the Cloud Management tab. While the case is being downloaded you can continue working in Planmeca Romexis but do NOT close it during download. If you try to close Romexis while the download is in progress you will be prompted to confirm closing Romexis.

Once the case has been downloaded and saved to the Romexis server you will be prompted if you want to open the image.

3 To open the case at a later time select it in Cloud Management tab and click **Open.**
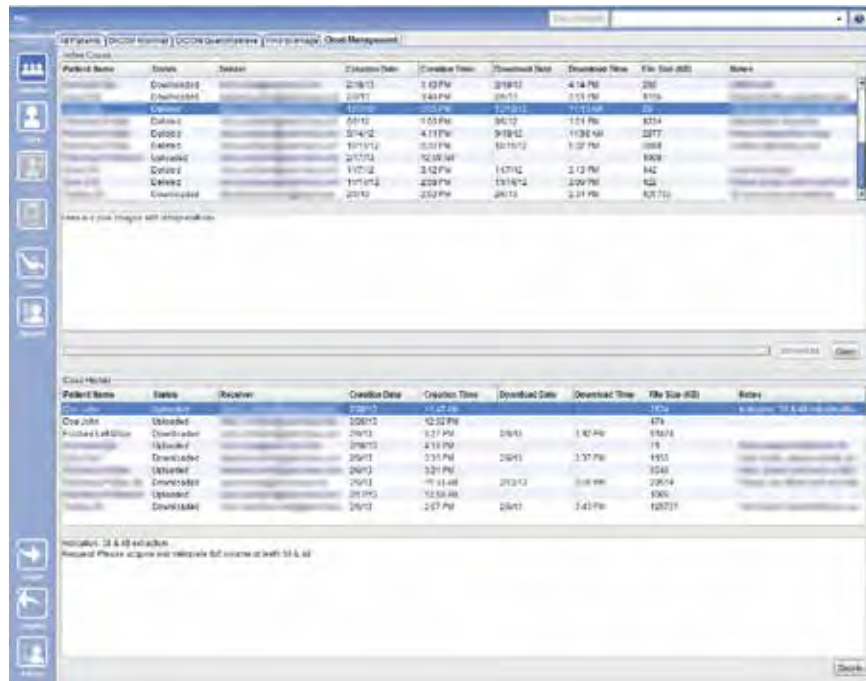
Managing cases

Sent and received cases can be managed in the Cloud Management tab. You can view the status of all the sent (Case History) and received (Active Cases) cases and also delete any sent cases.

Patient Name	Status	Receiver	Creation Date	Creation Time	Download Date
Doe, John	Uploaded	betu.2.cmolest@spangsournal.	26.2.2013	11:47	
Fracture Left Molar	Downloaded	osku.sundgvist@planmeca.com	6.2.2013	15:27	6.2.2013
Korhonen Elja	Uploaded	ismo.syrja@planmeca.com	18.2.2013	16:18	
Osku First	Downloaded	helianna.puhiin@planmeca.com	6.2.2013	15:31	6.2.2013
Planmeca ProMax	Uploaded	helianna.puhiin@planmeca.com	6.2.2013	15:21	
Planmeca ProMax 3D	Downloaded	jussi.hyrkas@planmeca.com	6.2.2013	11:33	13.2.2013
Planmeca ProSensor	Uploaded	osku.sundgvist@planmeca.com	17.2.2013	0:59	
Testing 3D	Downloaded	mira.mansikkamaki@planmeca...	8.2.2013	14:57	6.2.2013

Indication: 38 & 48 extraction
Request: Please acquire and interprete 8x8 volume of teeth 38 & 48

Send to iRomexis

To send the model to iOS click Send to iRomexis. For more information on how to use the Planmeca iRomexis see Planmeca Romexis User's Manual APPENDIX C: "PLANMECA iROMEXIS".

DDX Export

To send STL models via the DDX network to registered DDX Labs. For DDX configuration within Romexis, see "DDX Configuration" on page 230.

Sending Cases Through DDX

1   In the **CAD/CAM** module of the active patient, select the desired case file.

2   Click **DDX Export.**

If you are currently logged into DDX, you will see details of your other cases.

The available models for the case that you have selected are listed near the bottom of the screen. Ensure you have a ditched_prep model if your case has equigingival or subgingival margins. See "Retract" in Chapter 7 for more information.

3   Click **Create a New Case.**

> **Note:** If you are not already logged into DDX, a login screen will appear.

4   Select the desired lab from the list of **My Labs** or **Find A Lab.**

5   Fill out the form. You must select a **Procedure** and type the **tooth number(s).** The rest of the fields are optional.

6   Click **Submit Case.**

7   The system returns to the DDX Cloud screen. Click **Get New Case Info** to create the STL files and upload the information to your lab.

8   Click **Close** when the files are finished uploading.

21 *Romexis Configurations*

Note: The screenshots and websites in this chapter are not created by E4D Technologies and may have changed since this manual was published. Please see the Romexis User Manual or www.planmecausasupport.com for more information on Romexis.

There are several settings within Romexis that you may choose to modify depending on your need. Common changes are detailed below. For more information, please refer to the Romexis User Manual.

- Tooth Identification System
- Country/Regional settings
- Autonumber Patient ID
- DDX services
- Planmeca Romexis Cloud services

Opening Romexis Configuration

Romexis Configuration may be a tile on your Startup screen. If you do not see it there, use Search in the slide-out menu to find Romexis Configuration.

- Username: **sysadm**
- Password: enter your password

Note: Call E4D Customer Support or PlanScan Support for access and help with the configuration.

Changing Tooth Numbers and/or Country

1 On the left side, under **Resources,** select **Regional.**

2 Select **ADA** for the Universal tooth numbering system.

3 Select the desired country under Regional Settings.
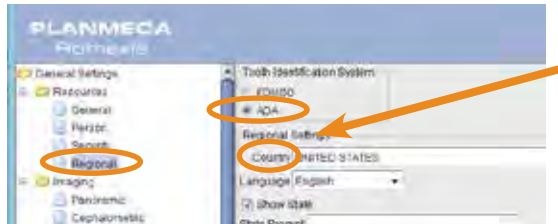

Patient File Changes

1 On the left side, under **Resources,** select **Person.**

2 If you do not want the Patient ID to be a mandatory field, select **Autonumber** under **Patient Identification.**

3 Make any other desired changes to the patient defaults.
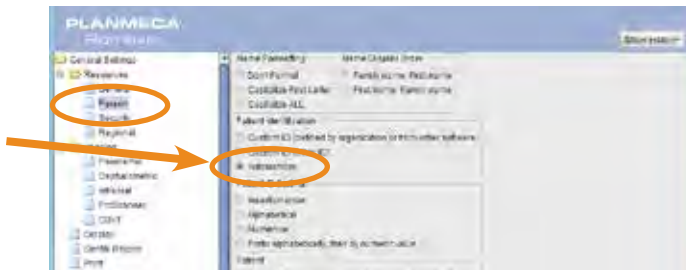
4 Click **OK** at the bottom to exit the Configuration screen.

DDX Configuration

1   Open **Romexis Configuration**. See "Opening Romexis Configuration" on page 228.

2   Click **DDX Dental**, then **(Re-)Register**
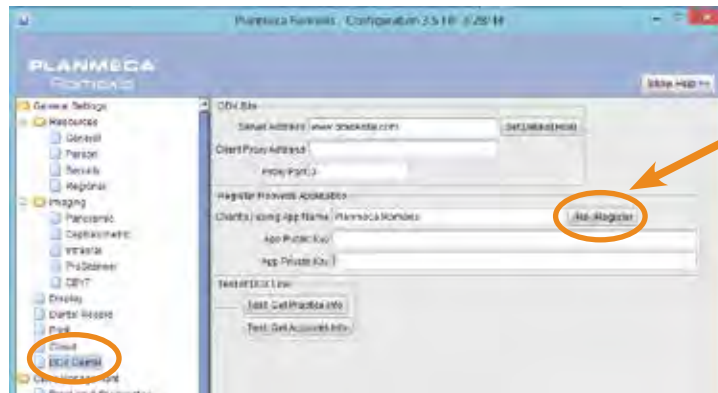
> **Note:** Clicking **(Re-)Register** will take you to the DDX dental website. If you have already registered enter your credentials for that site. Otherwise, click **Sign Up**.

3   After entering your credentials for the DDX website, click **I Approve** to register remote application.

4   Highlight and copy (right click) the **Remote Application Public Key**.

5 In the **Romexis Configuration** window, click inside the **App Public Key** field then CRTL+V.

6 Repeat these steps for the **Remote Application Private Key.**

7 Click **Test Get Practice Info**. This will open a new window with the practice information used on the DDX website.

8 Click **Test Get Accounts Info**. This will open a new window with the associated labs setup on the DDX website.
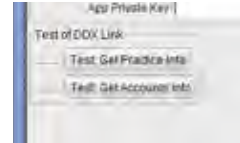
> **Note:** Click **Add Lab** after logging in to the DDX website to search for existing labs and associate them with your account.

9 Click **OK** to save.

Planmeca Romexis Cloud Configuration

The information regarding cloud users and requirements are subject to change. For latest information see Planmeca Online website at **online.planmeca.com**. In cases where the Planmeca Romexis Client workstation is behind a firewall, a firewall proxy server IP and port can be configured (see the Romexis users manual).

1 Create an online account at **online.planmeca.com**

> **Note:** To send files through Cloud services you must subscribe to the paid monthly service. A credit card is required to activate this service.

2 Open **Romexis.**

3 In the **Admin** module and **Resources** tab, click on **Users.**
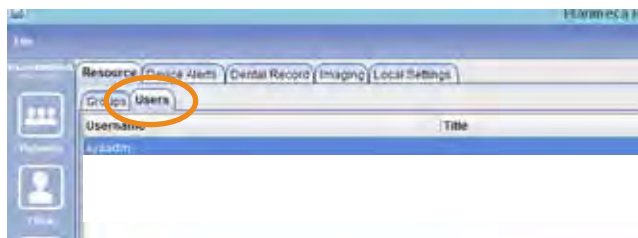
4   Double click the **sysadm** user.

5   Click the **Cloud** tab, enter your **Account ID** and **Password** used when creating the Planmeca Online account.

6   Click **Generate new Keys**, then click **OK** to save.

> **Note:** Click the **Web Link for Account Creation** if you have not already created an online account.

22 *Glossary*

A

Anatomy - the features that define the shape of a tooth: a series of concavities and the convexities that forms the light reflective surfaces that create the apparent shape of a tooth

Autogenesis - the process that the system uses to create a custom proposal for the scanned model. For full coverage crowns, Autogenesis looks at the features on the proximal teeth and creates a custom proposal based on cusp alignment, marginal ridges, contacts, occlusion, and minimum thickness.

B

Bellows - located inside the milling chamber, the bellows resembles an accordion and moves the restoration block

C

Contact - the area of a tooth that touches the adjacent tooth

D

DDX - Henry Schein DDX Digital Dental Exchange.

F

Fossa - an irregular depression or concavity on the occlusal surface of the tooth

G

Glaze - a thin, transparent coating on porcelain restorations

I

ICEverything - pronounced "I See Everything", often referred to as ICE. The textured view of the model, usually used for scans done in the mouth.

Inlay - a restoration made to fit a tapered cavity preparation, original cusps remain intact.

Insertion - the path created in the tooth preparation which will allow the restoration to be seated into the patient's mouth

Interlock Key - used for diagnostics by service technicians. It is important that you keep the key and know where it is stored in your office.

M

Mandrel - the metal piece of the restoration block that is inserted into the mill to hold the block steady during milling.

Margin - the outside edge of the preparation which marks where the outside of the restoration should meet prepared tooth.

O

Onlay - a restoration that restores one or more cusps and adjoining occlusal surfaces of the tooth.

Orientation - The selected model position for Autogenesis to propose the new restoration. Autogenesis in turn uses this set position as a starting point for cusp height and marginal ridges based on the proximal neighbors. The Orientation is used to align the model to aid in Autogenesis. When the orientation is correct, the proposal should be able to drop from the occlusal onto the preparation and the central groove should be aligned with the proximal teeth's central grooves. When viewed from the buccal or lingual, the model should follow the correct curve of spee.

P

Pontic - the artificial tooth in a bridge.

S

Scan - an image of the prepared tooth and surrounding teeth

Sprue - the connecting material between the restoration and the mandrel

W

Walking Tools - This is a term that refers to tools in the mill that are not seated properly, so they shift (walk). This can damage/ruin the block and cause the tools to break. Proper mill maintenance should prevent this problem.

23 *Index*